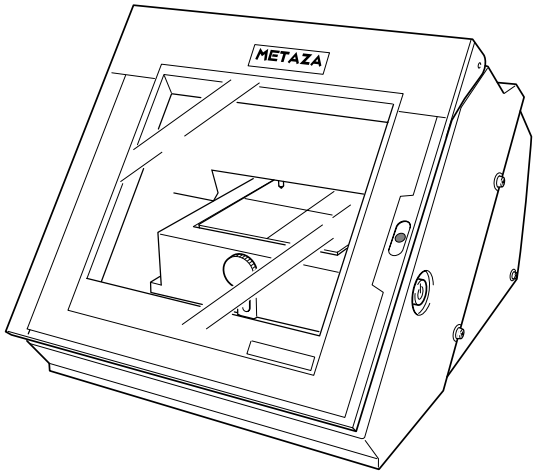
Roland

METAZA

•METAL PRINTER•

model MPX-60

USER'S MANUAL



Thank you very much for purchasing the product.

- To ensure correct and safe usage with a full understanding of this product's performance, please be sure to read through this manual completely and store it in a safe location.
- Unauthorized copying or transferral, in whole or in part, of this manual is prohibited.
- The contents of this operation manual and the specifications of this product are subject to change without notice.
- The operation manual and the product have been prepared and tested as much as possible. If you find any misprint or error, please inform us.
- Roland DG Corp. assumes no responsibility for any direct or indirect loss or damage which may occur through use of this product, regardless of any failure to perform on the part of this product.
- Roland DG Corp. assumes no responsibility for any direct or indirect loss or damage which may occur with respect to any article made using this product.

Roland DG Corporation

For the USA

FEDERAL COMMUNICATIONS COMMISSION
RADIO FREQUENCY INTERFERENCE
STATEMENT

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules.
These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.
This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.
Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Unauthorized changes or modification to this system can void the users authority to operate this equipment.

The I/O cables between this equipment and the computing device must be shielded.

For Canada

CLASS A NOTICE

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

CLASSE A AVIS

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

ROLAND DG CORPORATION
1-6-4 Shinmiyakoda, Hamamatsu-shi, Shizuoka-ken, JAPAN 431-2103
MODEL NAME : See the MODEL given on the rating plate.
RELEVANT DIRECTIVE : EC LOW VOLTAGE DIRECTIVE (73/23/EEC)
EC ELECTROMAGNETIC COMPATIBILITY DIRECTIVE (89/336/EEC)

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To Ensure Safe Use

About ⚠WARNING and ⚠CAUTION Notices

⚠WARNING	Used for instructions intended to alert the user to the risk of death or severe injury should the unit be used improperly.
⚠CAUTION	Used for instructions intended to alert the user to the risk of injury or material damage should the unit be used improperly. * Material damage refers to damage or other adverse effects caused with respect to the home and all its furnishings, as well to domestic animals or pets.

About the Symbols

	The △ symbol alerts the user to important instructions or warnings. The specific meaning of the symbol is determined by the design contained within the triangle. The symbol at left means "danger of electrocution."
	The ⃠ symbol alerts the user to items that must never be carried out (are forbidden). The specific thing that must not be done is indicated by the design contained within the circle. The symbol at left means the unit must never be disassembled.
	The ● symbol alerts the user to things that must be carried out. The specific thing that must be done is indicated by the design contained within the circle. The symbol at left means the power-cord plug must be unplugged from the outlet.

⚠WARNING

Do not disassemble, repair, or modify.
Doing so may lead to fire or abnormal operation resulting in injury.

Ground the unit with the ground wire.
Failure to do so may result in risk of electrocution in the event of a mechanical problem.

Do not use with any power supply other than the dedicated AC adapter.
Use with any other power supply may lead to fire or electrocution.

Do not use with any electrical power supply that does not meet the ratings displayed on the AC adapter.
Use with any other power supply may lead to fire or electrocution.

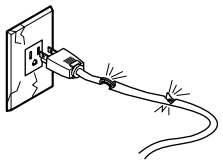
Do not use while in an abnormal state (i.e., emitting smoke, burning odor, unusual noise, or the like).
Doing so may result in fire or electrocution. Immediately unplug the power-cord plug from the electrical outlet, and contact your authorized Roland DG Corp. dealer or service center.

Use only with the power cord included with this product.
Use with other than the included power cord may lead to fire or electrocution.

⚠CAUTION

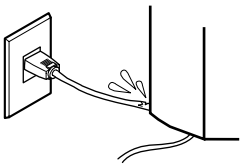
Do not use with a damaged AC adapter, power cord, or power-cord plug, or with a loose electrical outlet.

Doing so may lead to fire, electrical shock, or electrocution.



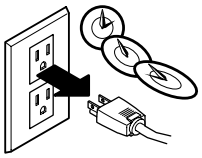
Do not damage or modify the electrical power cord, subject it to excessive bending, twisting, pulling, binding, or pinching, or place any object or weight on it.

Doing so may damage the electrical power cord, leading to fire, electrical shock, or electrocution.



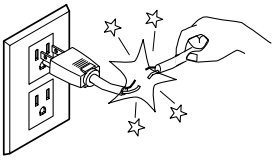
When not in use for several hours, unplug the power-cord plug from the electrical outlet.

Failure to do so may result in danger of electrical shock, electrocution, or fire due to deterioration of electrical insulation.



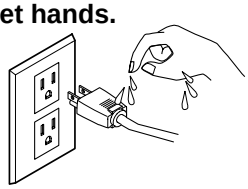
When unplugging the electrical power cord from the power outlet, grasp the plug, not the cord.

Unplugging by pulling the cord may damage it, leading to fire, electrical shock, or electrocution.



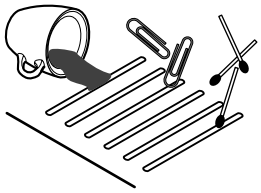
Do not attempt to unplug the power-cord plug with wet hands.

Doing so may result in electrical shock or electrocution.



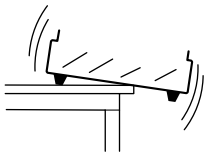
Do not allow liquids, metal objects or flammables inside the machine.

Such materials can cause fire.



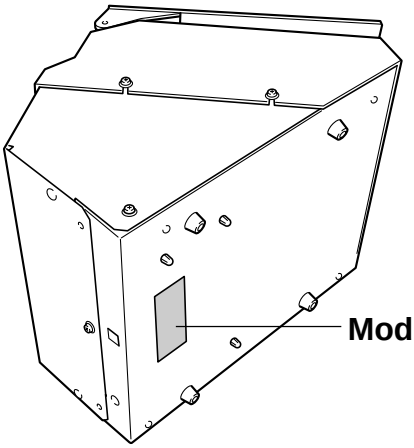
Install on a stable surface.

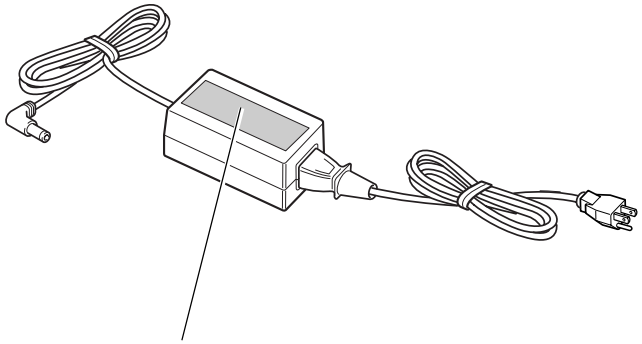
Failure to do so may result in the unit tipping over, leading to injury.



About the Labels Affixed to the Unit

These labels are affixed to the body of this product.
The following figure describes the location and content of these messages.





Rating label

Do not use with any electrical power supply that does not meet the ratings displayed on the AC adapter.

In addition to the ⚠**WARNING** and ⚠**CAUTION** symbols, the symbols shown below are also used.

NOTICE : Indicates information to prevent machine breakdown or malfunction and ensure correct use.

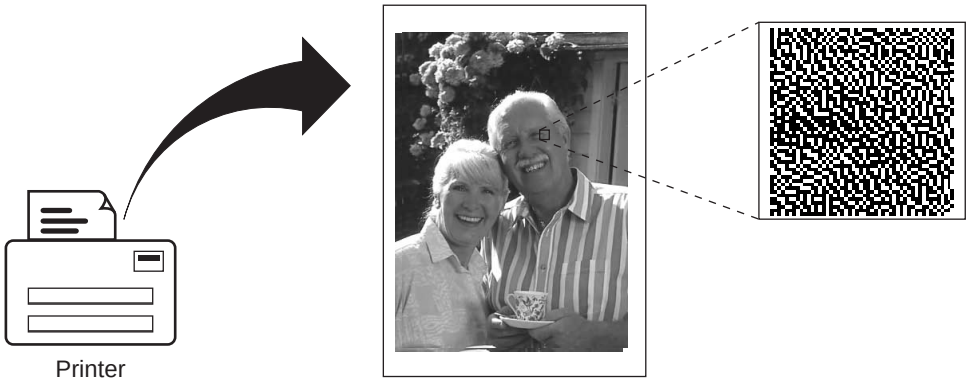
: Indicates a handy tip or advice regarding use.

What's Metaza?

This machine is a metal printer.
It can mark photographs, drawings, text, and the like on the surfaces of flat metal and plastic. For more information about materials that can be marked, see "2-1 Getting Ready to Perform Marking."

How the Machine Works

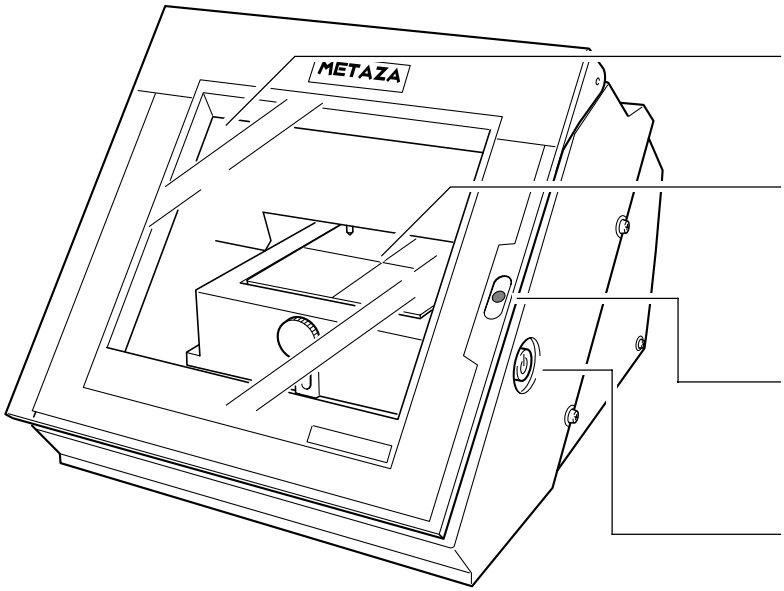
This machine uses a diamond tipped stylus to mark the surface of metal or plastic, creating intricate depressions.
The size of the depressions is varied by controlling the marking force, making it possible to express light and dark areas of the image.
This is exactly analogous to the way a monochrome printer expresses light and dark area by varying the size and arrangement of dots.



If the marking force is not varied according to the hardness of the metal, different marking results will be obtained for the same image.
However, there is no need to make troublesome settings.
Just use the included Windows driver and choose the composition of the material you want to mark.
Choosing the composition automatically selects the suitable marking force for the material.

Even when the composition is the same, strength may vary if the casting method or post-machining method is changed. In such cases, make fine adjustments in the marking force. (You can save the adjustment results in a file.)

Part Names



Cover

Close the cover when performing marking.

Base

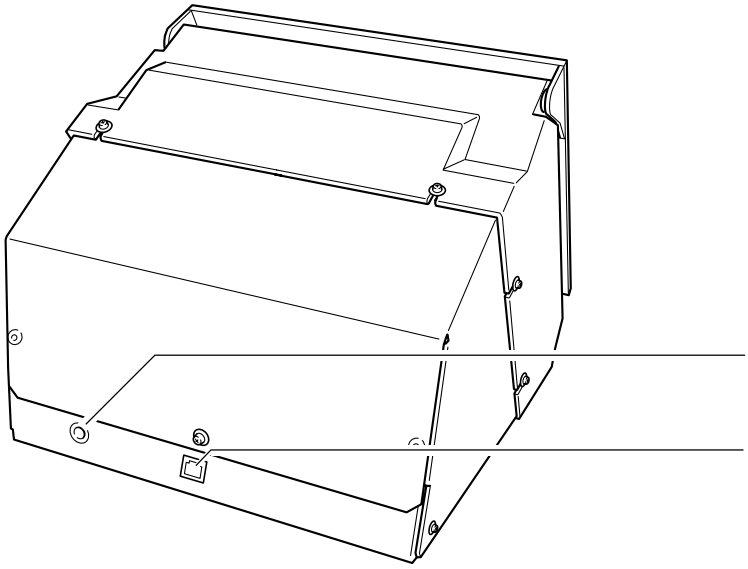
You can detach this from the machine.
A workpiece is loaded on the base. You can secure it in place without using commercially available adhesive tape.

STANDBY LED

This lights up when the power is on.
When it is flashing, it indicates that an error has occurred.

[STANDBY] key

This switches the power on and off.



AC adapter jack

This is for connecting the included AC adapter.

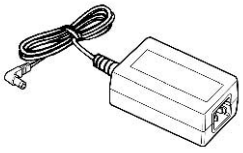
USB connector

This is for connecting a commercially available USB cable (sold separately).

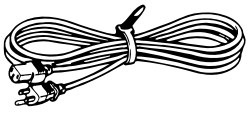
1 What to Do Before Marking

1-1 Checking the Accessories

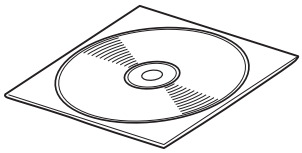
The following items are packed together with the unit.
Check the following to make sure that you received all the items that were shipped along with the unit.



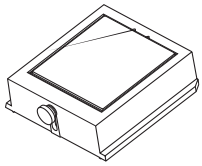
AC adapter



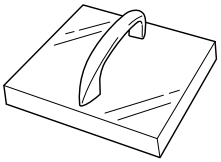
Power cord



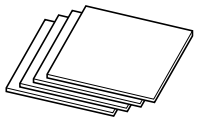
CD-ROM



Base

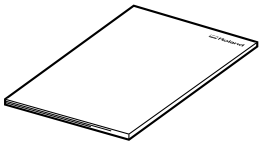


Leveler



Marking material
(for testing use: brass)

Phillips screwdriver



User's manual

1-2 Setting Up and Connection

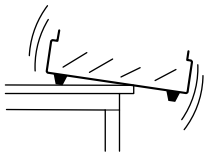
⚠WARNING

Do not use with any power supply other than the dedicated AC adapter.
Use with any other power supply may lead to fire or electrocution.

Use only with the power cord included with this product.
Use with other than the included power cord may lead to fire or electrocution.

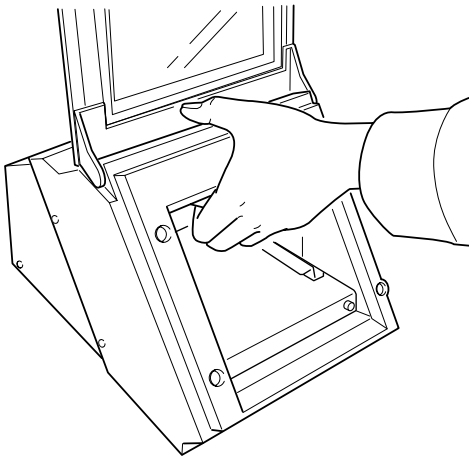
⚠CAUTION

Install on a stable surface.
Failure to do so may result in the unit tipping over, leading to injury.



NOTICE

When moving the machine, as shown in the figure, do not grasp the top portion.
Grip the bottom of the machine with both hands on the left right.



To prevent accidents, do not install in any of the following types of areas.

- Avoid use in areas subject to strong electric noise.
- Avoid use in areas subject to high humidity or dust.
- This machine generates heat when used, and should not be installed in an area with poor heat radiation characteristics.
- Do not install in an area subject to strong vibration.

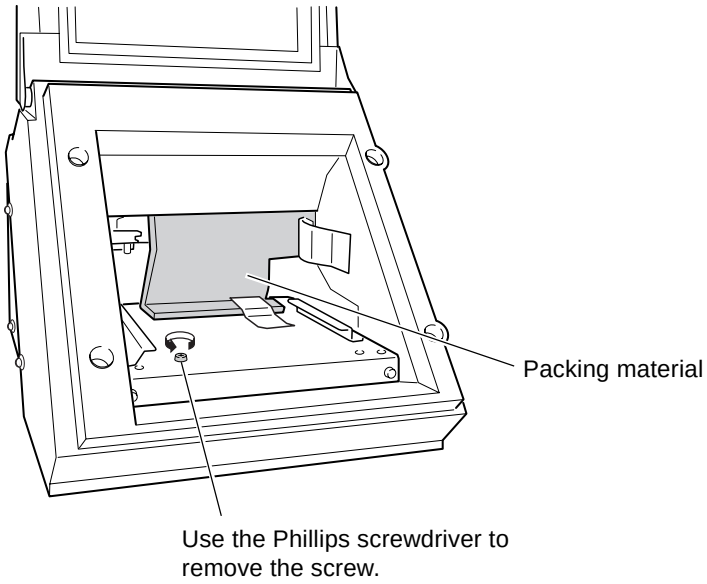
Use within a temperature range of 10 to 30°C (50 to 86°F) and within a humidity range of 35 to 80%.

Securely connect the power cord that they will not be unplugged and cause failure during operation. Doing so may lead to faulty operation or breakdown.

Remove the Protective Media

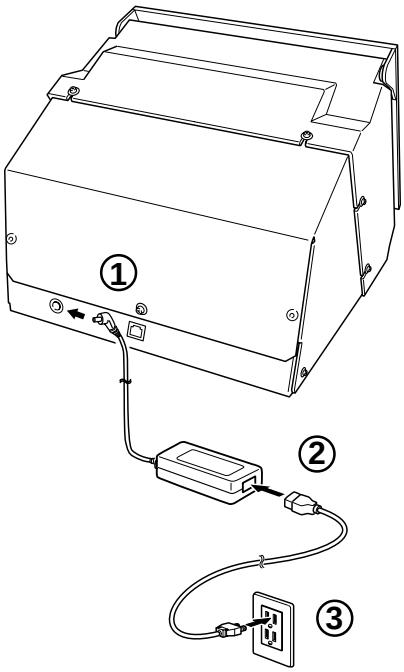
The protective media shown below is attached to this machine when it is shipped from the factory. When you have finished installing the machine, remove the protective media.

Remove the packing material and screw.



Connecting the AC Adapter and Power Cord

Connect in the order of the numbers shown in the figure.



NOTICE **Do not connect the USB cable yet.**

You connect the USB cable when you install and set up the software.

☞ See "1-3 Installing and Setting Up to the Software."

1-3 Installing and Setting Up to the Software

System Requirements

■ System Requirements for Installing the Software

Operating system	Windows 98/Me/2000/XP
Computer	Computer running Windows (Pentium processor or better recommended)
Drive	CD-ROM drive
Monitor	Windows-compatible monitor capable of displaying 256 colors or more
Memory (RAM)	64 MB or more recommended
Free hard-disk space required for installation	5 MB
Interface	USB port

■ System Requirements for USB Connection

Making a USB connection with Windows requires use of a computer that meets all of the following system requirements. Please note that other configurations cannot be supported.

Operating system	Windows 98/Me/2000/XP (Windows 95 and Windows NT4.0 are not supported.)
Computer	1) Computers preinstalled with Windows 98/Me/2000/XP at the time of purchase (This includes such computers later upgraded to Windows Me/2000/XP.) 2) Computers on which USB operation is assured by the manufacturer of computers

- The ability to make a USB connection depends on the specifications of the computer. To determine whether the computer you're using is capable of correct USB operation, check with the manufacturer of the computer.
- Use a shielded USB cable having a length of 3 meters or less. Do not use a USB hub or the like.

Installing Dr.METAZA2

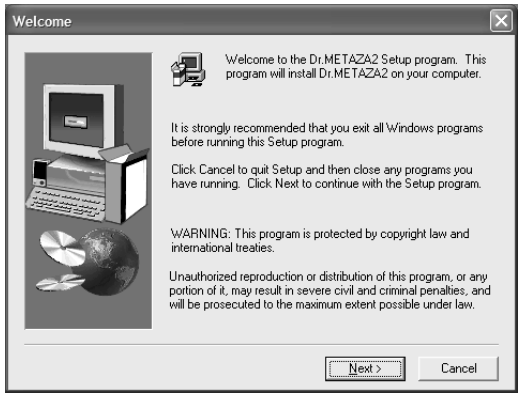
Dr.METAZA2 is a program for using the machine to mark images on the surface of materials.
The steps for installing Dr.METAZA2 following installing the driver is shown below.

1 Switch on the computer and start Windows.
If you are installing under Windows XP/2000, log on an account with "Administrators" rights.
For more information about account, refer to the documentation for Windows.

2 Place the included CD-ROM in the CD-ROM drive.
The Setup menu appears automatically.

3 Click [Dr.METAZA2 Install].
The Setup program starts.

4 Follow the messages to carry out setup and finish setting up the program.


Welcome
Welcome to the Dr.METAZA2 Setup program. This program will install Dr.METAZA2 on your computer.
It is strongly recommended that you exit all Windows programs before running this Setup program.
Click Cancel to quit Setup and then close any programs you have running. Click Next to continue with the Setup program.
WARNING: This program is protected by copyright law and international treaties.
Unauthorized reproduction or distribution of this program, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under law.
Next >
Cancel

Installing the Driver

A driver must be installed in order to operate the machine.
Follow the steps below to install.

■ Windows XP

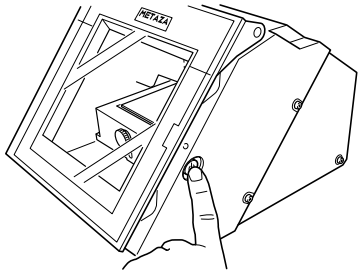
NOTICE **Keep the machine and the computer unconnected until you carry out this installation operation.** Failure to follow the correct procedure may make installation impossible.

☞ See "Installing the Driver" "What to Do If Installation Is Impossible."

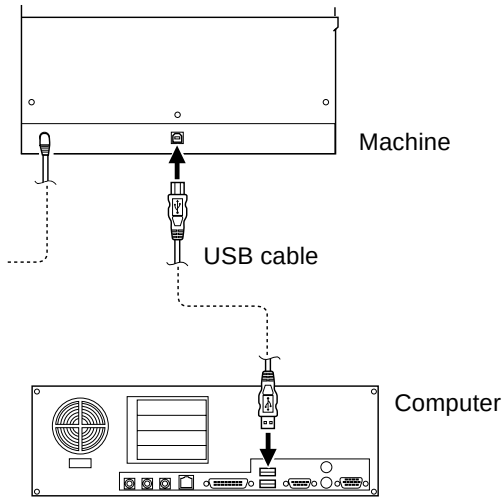
1 Before you start installation and setup, make sure the USB cable is not connected.

2 Appear the setup menu of the CD-ROM.

3 Press the [STANDBY] key to switch on the machine.



4 Connect the machine using a USB cable.
The [Found New Hardware Wizard] appears.



5 Choose [Install the software automatically (Recommended)], then click [Next].

Installation of the USB driver starts automatically.

Found New Hardware Wizard
Welcome to the Found New Hardware Wizard
This wizard helps you install software for:
Roland MPX-60
If your hardware came with an installation CD or floppy disk, insert it now.
What do you want the wizard to do?
Install the software automatically (Recommended)
Install from a list or specific location (Advanced)
Click Next to continue.
< Back
Next >
Cancel

6 When the screen appears, click [Continue Anyway].

Hardware Installation
The software you are installing for this hardware:
Printers
has not passed Windows Logo testing to verify its compatibility with Windows XP. (Tell me why this testing is important.)
Continuing your installation of this software may impair or destabilize the correct operation of your system either immediately or in the future. Microsoft strongly recommends that you stop this installation now and contact the hardware vendor for software that has passed Windows Logo testing.
Continue Anyway
STOP Installation

7 Click [Finish].

This completes the installation.

■ Windows 98/Me/2000

NOTICE **Keep the machine and the computer unconnected until you carry out this installation operation.** Failure to follow the correct procedure may make installation impossible.

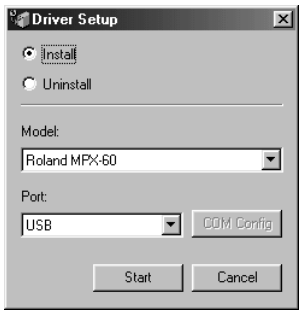
☞ See "Installing the Driver" "What to Do If Installation Is Impossible."

1 Before you start installation and setup, make sure the USB cable is not connected.

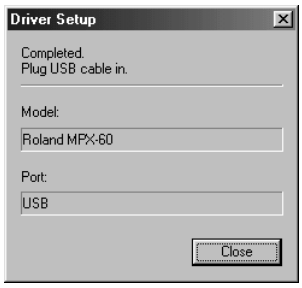
2 Appear the setup menu of the CD-ROM.

3 Click [METAZA Driver Install].
The next screen appears.

4 Select [Install]. From [Port] box, select [USB], then click [Start].
Installation of the driver starts.



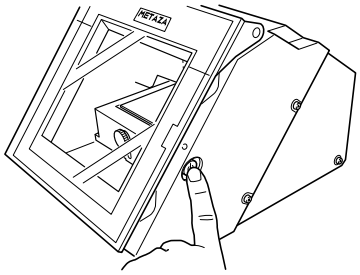
5 When all installation finishes, the screen shown at right appears. Click [Close].



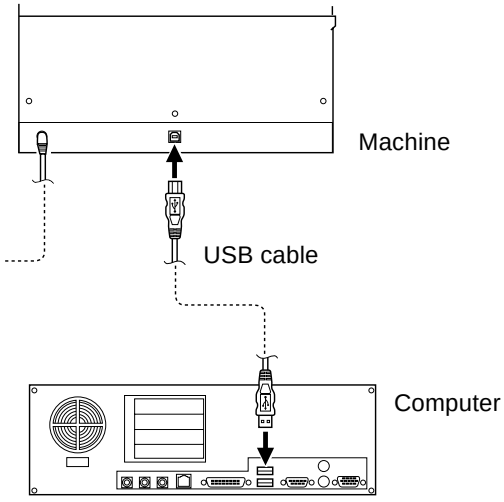
6 When the setup menu for installation reappears, click ☒.

7 Remove the CD-ROM from the CD-ROM drive.

8 Press the [STANDBY] key to switch on the machine.



9 Connect the machine to your computer using a USB cable.
The driver is automatically registered in your computer.



■ What to Do If Installation Is Impossible

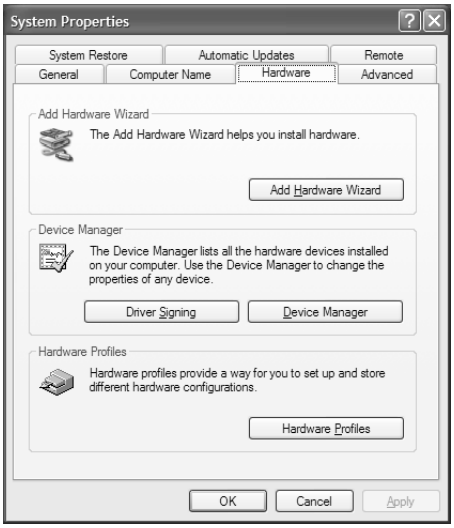
If installation quits partway through, or if the wizard does not appear when you make the connection with a USB cable, take action as follows.

Windows XP/2000

1 If the [Found New Hardware Wizard] appears, click [Finish] to close it.

2 **Windows XP**
Click the [Start] menu, then right-click [My Computer]. Click [Properties].

Windows 2000
Right-click [My Computer] on the desktop. Click [Properties].



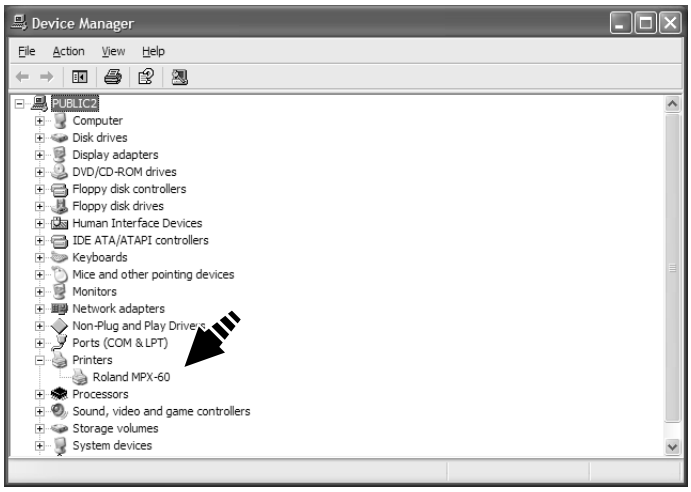
3 Click the [Hardware] tab, then click [Device Manager]. The [Device Manager] appears.

4 At the [View] menu, click [Show hidden devices].

5 In the list, find [Printers] or [Other device], then double-click it.

When [Roland MPX-60] or [Unknown device] appears below the item you selected, click it to choose it.

6 Go to the [Action] menu, and click [Uninstall].



7 The screen shown at right appears.

Click [OK].

8 Close the [Device Manager] and click [OK].

9 Unplug the USB cable from your computer.

10 Uninstalling the driver.
Follow the procedure in the next section "Uninstalling the Driver", step 3 and after to uninstall the driver.

11 Follow the procedure in "Installing the Driver" to redo installation from the beginning.

Windows 98/Me

1 Unplug the USB cables from your computer.

2 Appear the setup menu of the CD-ROM.

3 Uninstalling the driver.
Follow the procedure in the next section "Uninstalling the Driver", step 3 and after to uninstall the driver.

4 Follow the procedure in "Installing the Driver" to redo installation from the beginning.

Uninstalling the Driver

When uninstalling the driver, perform following operation.

■ Windows XP/2000

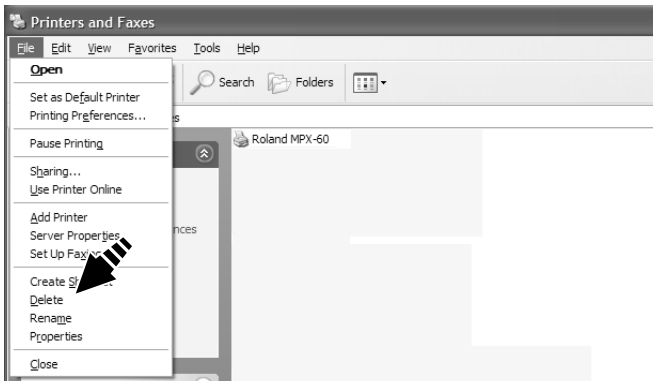
1 Before you start uninstallation of the driver, unplug the USB cables from your computer.

2 Log on to Windows as “Administrators” account.
For more information about account, refer to the documentation for Windows.

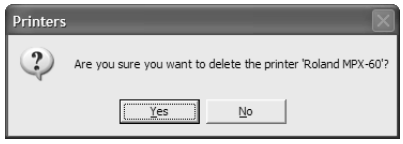
3 **Windows XP**
From the [Start] menu, click [Control Panel]. Click [Printers and Other Hardware], then click [Printers and Faxes].

Windows 2000
From the [Start] menu, click [Setting]. Then Click [Printers].

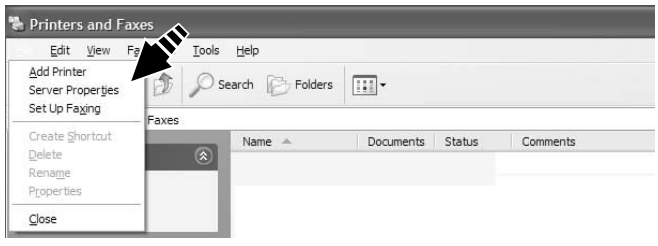
4 If [Roland MPX-60] appears, click the [Roland MPX-60] icon.
From the [File] menu, choose [Delete].



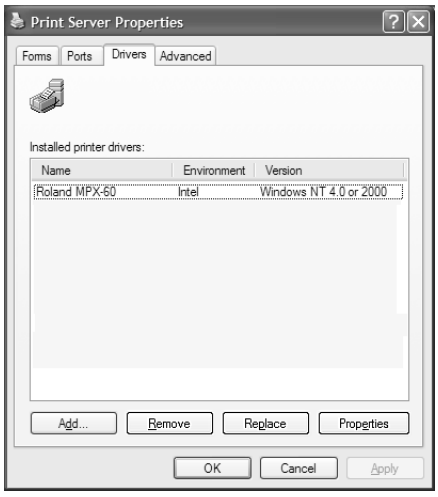
5 When the screen prompting you to confirm deleting appears, click [Yes].



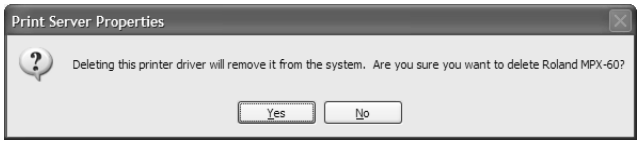
6 From [File] menu, click [Server Properties].
The next screen appears.



7 Click the [Drivers] tab.
If [Roland MPX-60] appears, choose [Roland MPX-60] from the list, then click [Remove].



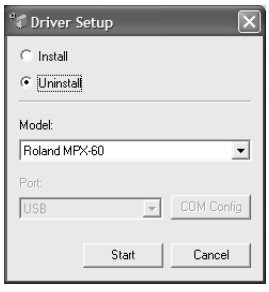
8 When the screen prompting you to confirm deleting appears, click [Yes].


Print Server Properties
Deleting this printer driver will remove it from the system. Are you sure you want to delete Roland MPX-60?
Yes
No

9 Insert the Roland Software Package CD-ROM into the CD-ROM drive.
The setup menu appears automatically.

10 Click [METAZA Driver Install].
The next screen appears.

11 Select [Uninstall], then click [Start].
When driver is deleted, the next screen appears.



12 Click [Yes] to restart the computer.

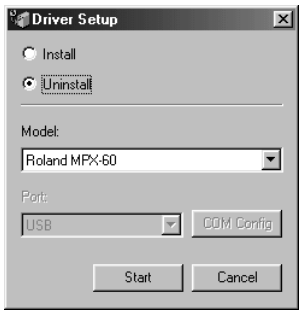
■ Windows 98/Me

1 Before you start uninstallation of the driver, unplug the USB cables from your computer.

2 Insert the Roland Software Package CD-ROM into the CD-ROM drive.
The setup menu appears automatically.

3 Click [METAZA Driver Install].
The next screen appears.

4 Select [Uninstall], then click [Start].
When driver is deleted, the next screen appears.



5 Click [Yes] to restart the computer.

2 Performing Marking

2-1 Getting Ready to Perform Marking

Before you start marking, have on hand a workpiece and an image for marking.

Preparing the Workpiece for Marking

Provide a workpiece that meets all of the following conditions.
Correct marking is not possible if even one of the conditions is not satisfied.

■ Conditions for materials that can be marked

Thickness: 0.3 to 20 mm (0.01 to 0.8 in.)

Size: Length (or width) of 90 mm (3-9/16 in.) or less

* Note that even if thickness and size are within the range as described above, it may not be possible to perform marking correctly on materials that warp when struck. Refer to the table below, which provides a general guide to markable sizes according to thicknesses.

Material	Thickness	Markable workpiece size (general guide)
Aluminium	2.0 mm (0.08 in.)	Length (or width) of 60 mm (2-3/8 in.) or less
	1.5 mm (0.06 in.)	Length (or width) of 40 mm (1-9/16 in.) or less
	1.0 mm (0.04 in.)	Length (or width) of 30 mm (1-3/16 in.) or less
	0.5 mm (0.02 in.)	Length (or width) of 20 mm (3/4 in.) or less
	0.3 mm (0.01 in.)	Length (or width) of 20 mm (3/4 in.) or less
Brass or copper	2.0 mm (0.08 in.)	Length (or width) of 60 mm (2-3/8 in.) or less
	1.5 mm (0.06 in.)	Length (or width) of 40 mm (1-9/16 in.) or less
	1.0 mm (0.04 in.)	Length (or width) of 30 mm (1-3/16 in.) or less
	0.5 mm (0.02 in.)	Length (or width) of 15 mm (9/16 in.) or less
	0.3 mm (0.01 in.)	Length (or width) of 15 mm (9/16 in.) or less
Stainless steel	2.0 mm (0.08 in.)	Length (or width) of 60 mm (2-3/8 in.) or less
	1.0 mm (0.04 in.)	Length (or width) of 40 mm (1-9/16 in.) or less

Important!

The sizes are suggestions. Depending on the size (marking area) of the image for marking, the markable size of the workpiece may vary.

Hardness of surface to mark

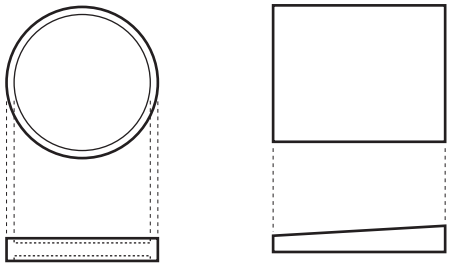
Vickers hardness (HV) of 200 or less

* Note that materials which may crack or split by marking (such as glass, stone, precious stones, china, and porcelain) cannot be marked even if hardness is within the preceding range. Attempting to mark such materials may damage the machine.

Shape of surface to mark

Flat, with no difference in level

- Examples of material that cannot be marked



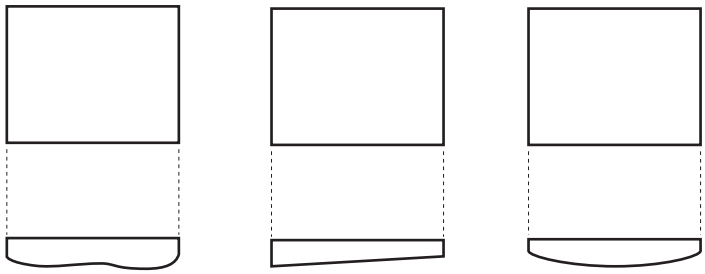
Edge of the material is too high.

Surface to mark is not straight.

Shape of the back of the surface to mark

When placed on the base, the surface to mark must be flat and level.

- Examples of material that cannot be marked



Back surface is uneven.

Back surface is not straight.

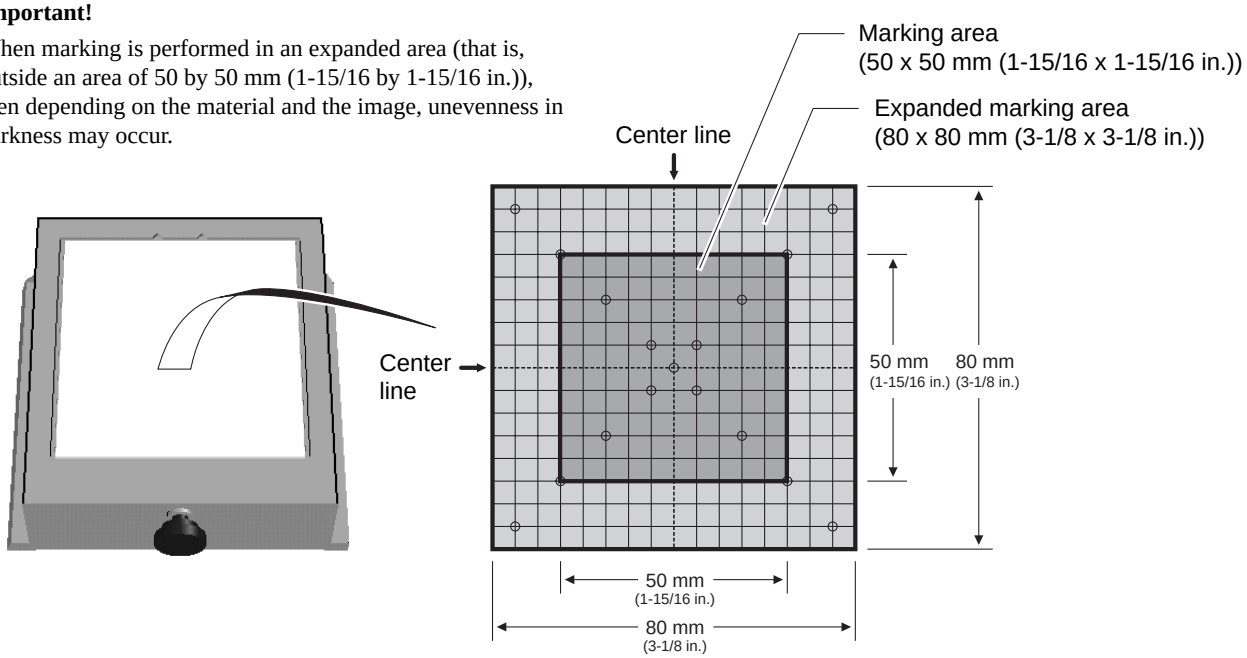
Back surface is curved.

■ About the Marking Area

The marking area of this machine is as shown below.

Important!

When marking is performed in an expanded area (that is, outside an area of 50 by 50 mm (1-15/16 by 1-15/16 in.)), then depending on the material and the image, unevenness in darkness may occur.



Preparing the Image

Prepare an image (such as a photograph or drawing) for marking.
Vector data cannot be used. Provide bitmap data.
Bitmap data in JPEG or BMP format can be used with Dr.METAZA2. If you're using a commercially available program to prepare the data, refer to the program documentation.

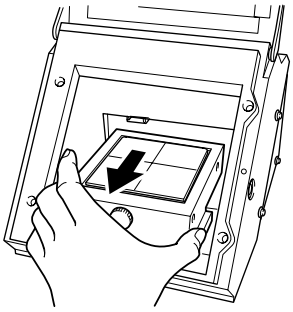
[Definition] Bitmap Data and Vector Data

Bitmap data uses a format that represents images as a collection of dots (points). Bitmap data is sometimes called "bitmapped graphics" or "raster data." Most paint-type applications (ex. Paint and Adobe Photoshop) display images as bitmap data.
Vector data uses a format that represents images as a number of reference points and lines that connect these points. Applications such as many draw-type programs (ex. Adobe Illustrator and CorelDRAW) can be used to create images using vector data.

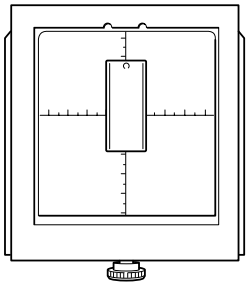
2-2 Loading the Workpiece

1 Open the cover.

2 Grasp the base on both sides and pull back toward you to remove.



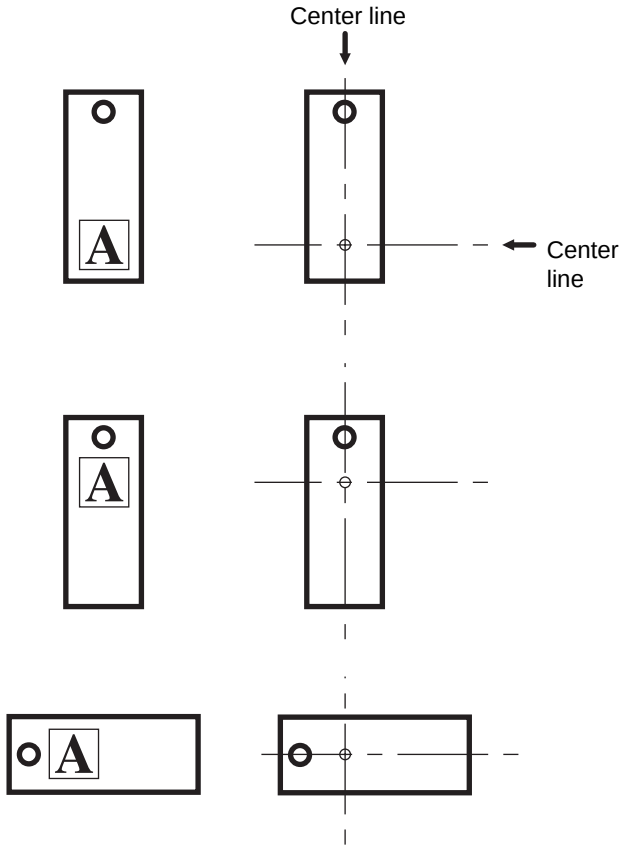
3 Place the workpiece so that the center of the place to mark is aligned with the center of the scale.



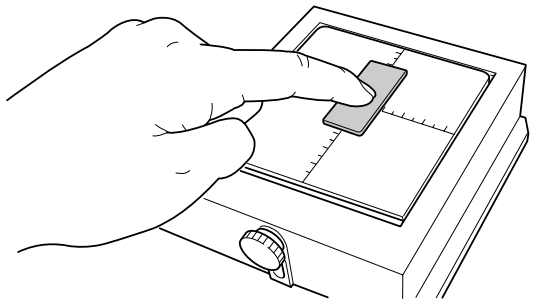
Important!

Powder or dust on the adhesive sheet can reduce the sheet's adhesive force, making it impossible to secure material in place.
If the adhesive force has been reduced, then wash the adhesive sheet. Washing the sheet revitalizes its adhesive force. For information on how to clean the adhesive sheet, take a look at "4 Maintenance", "Cleaning the Adhesive Sheet."

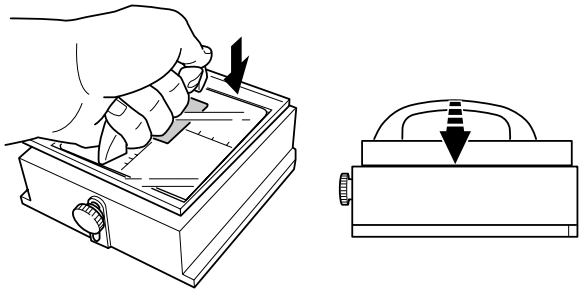
Marking location on the image	Location where the workpiece is placed on the base



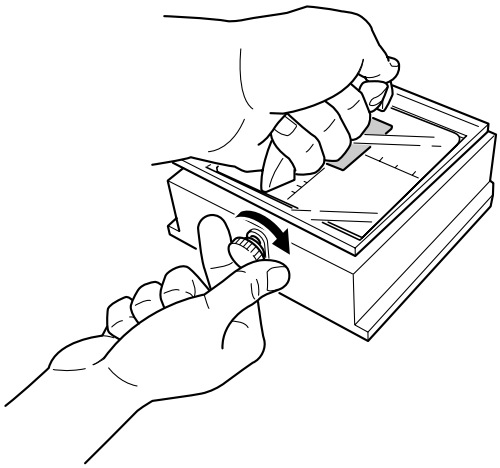
4 Press down on the workpiece gently to secure it in place.
Pressing down forcefully may make it difficult to remove the workpiece from the base.



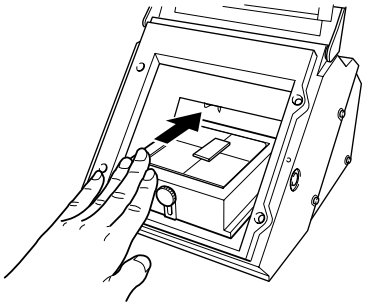
5 Loosen the screw and press down from above with the leveler.
Press down until the leveler completely touches the top surface of the base. There is no need to use excessive force.



6 While pressing down with the leveler, tighten the screw.
When tightening the screw, be careful not to let the height of the surface to be marked change.



7 Load the base on the machine.
Slowly press it in inward until it makes contact.
Press it inward securely until it makes contact. Do not stop partway, before contact is made.



8 Close the cover.

2-3 Performing Marking

This section explains the steps of actual marking, using the brass medallion shown below as an example.

Creating Marking Data

Create the data for marking the workpiece.
Import the photograph (or drawing) you prepared in "2-1 Getting Ready to Perform Marking," and design the data import mark.
In this example, we'll use Dr.METAZA2 as the design tool for the marking data. If you're using a commercially available program to prepare the data, refer to the user's documentation for the program.

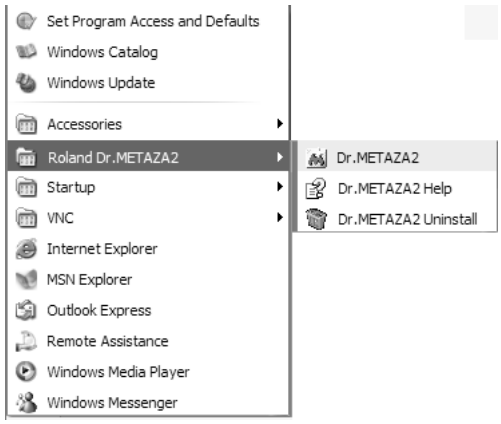
NOTICE Leave a margin of 1 mm (1/16 in.) or more from the edges of the workpiece.
Performing marking right up to the full dimensions of the workpiece may shorten the service life of the head.

■ Starting Dr.METAZA2

1

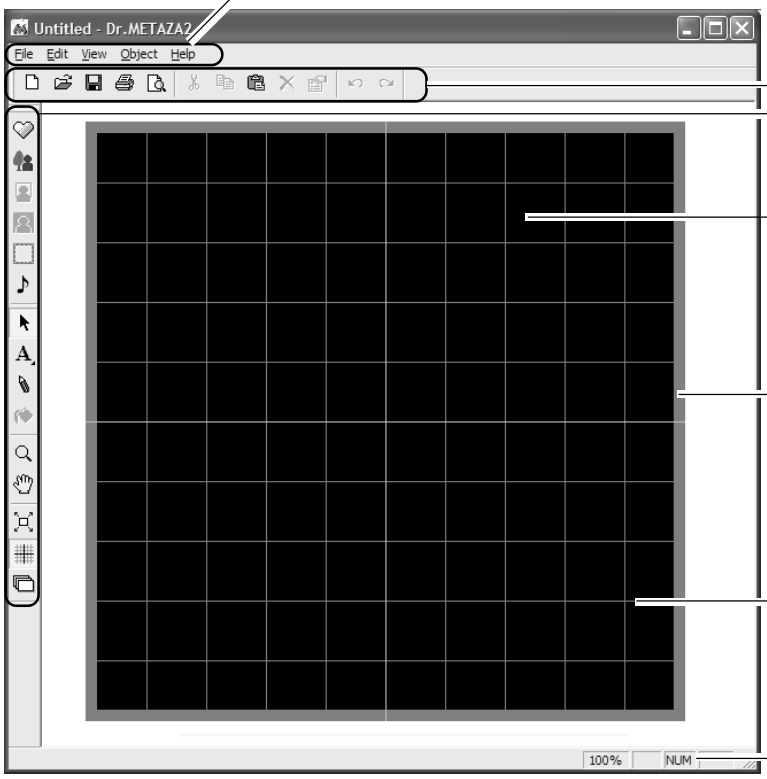
Windows XP
Click [Start] and point to point to [All Programs].
Point to [Roland Dr.METAZA2] and click [Dr.METAZA2].

Windows 98/Me/2000
Click [Start] and point to [Programs].
Point to [Roland Dr.METAZA2] and click [Dr.METAZA2].



After the opening screen, the screen for Dr.METAZA2 appears.

Names and Functions of Dr.METAZA2's Screen Items



Menu Bar

Runs the various commands for Dr.METAZA2.

Toolbar

The toolbar is provided with buttons for running Dr.METAZA2 commands such as [Open...] and [Save]. Moving the mouse pointer over a button displays a brief description of the button's function.

Material

The combined black and gray areas indicate the workpiece.
To decide on the size and shape of the workpiece, then from the [File] menu, click [Material Setup...].

Margin

The gray area indicates the margin. The margin areas are not marked.
A quadrilateral margin is established on the inner side of the workpiece. Please note that it does not follow the shape of the edges of the workpiece.
To change the size of the margin, from the [File] menu, click [Preferences...].

Grid

This is a grid of lines displayed on the screen. It serves as a guide for positioning images and text.

To hide the displayed grid, click to clear the selection.

Status Bar

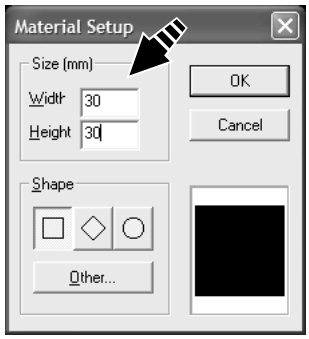
This shows Dr.METAZA2's state of operation and provides brief descriptions of commands. This also shows amount of zoom in or zoom out for the image.

■ Decide on the Size and Shape of the Workpiece

Enter the size (outer dimensions) of the workpiece, and choose the shape.
In this example, enter a size of 30 mm by 30 (1-1/8 in. by 1-1/8) shape, and choose a circle as the shape.

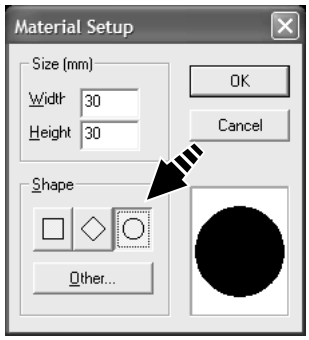
1 From the [File] menu, click [New...].
The [Material Setup] dialog box appears.

2 Enter the outer dimensions of the workpiece.
Here, enter "30" for both [Height] and [Width].



3 Choose the shape of the workpiece.
If the shape is a circle (ellipse), quadrilateral or diamond, click the corresponding shape icon. To choose another registered shape, click [Other...].

In this example, click .



Tip

To register a shape that is not listed, click [Add...]. For more information, see "3-1 Adding a Workpiece Shape."

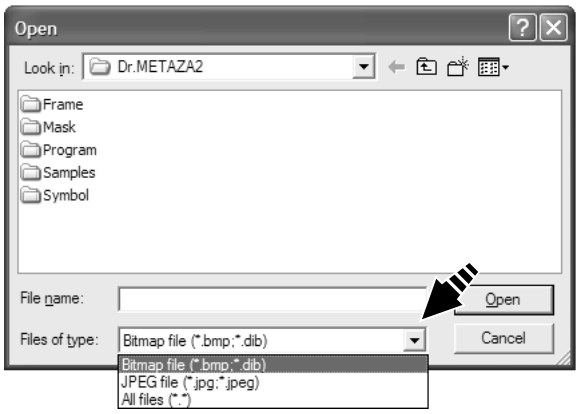
4 Click [OK].

■ Import an Image

Import the image of the photo or drawing, then adjust the size and position.

1 From the [File] menu, click [Import].
The [Open] dialog box appears.

2 Click the drop-down arrow for "Files of type," then select the file format of the image.

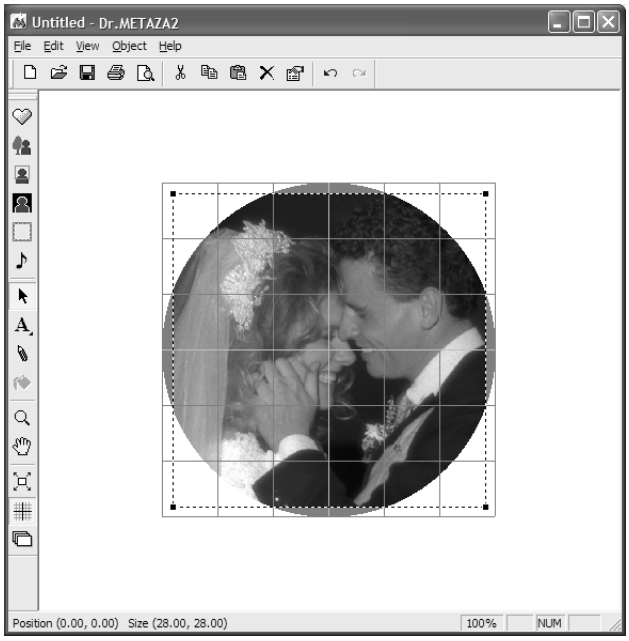


3 Select the desired file, then click [Open].
The specified image is imported and displayed on the screen.

4 If you want to use only a portion of the image, perform trimming. For more information, see "3-2 Trimming an Image."

5 To change the size of the image, drag the pointers (■) around the image.

6 Drag the image to change its position.



■ Add Text

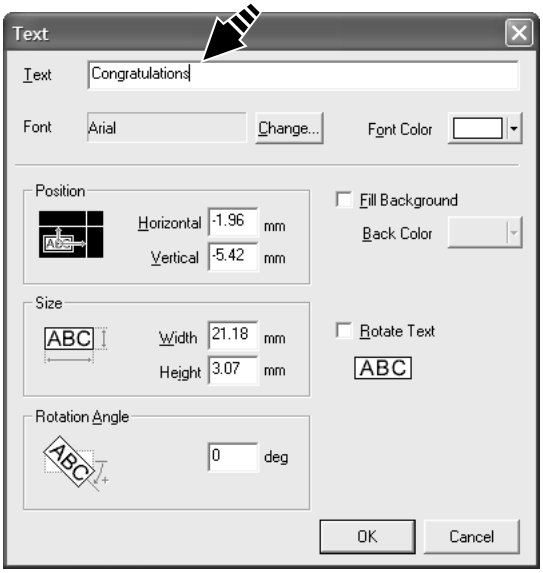
Add text to the image.

1 Click , select [Horizontal Text].

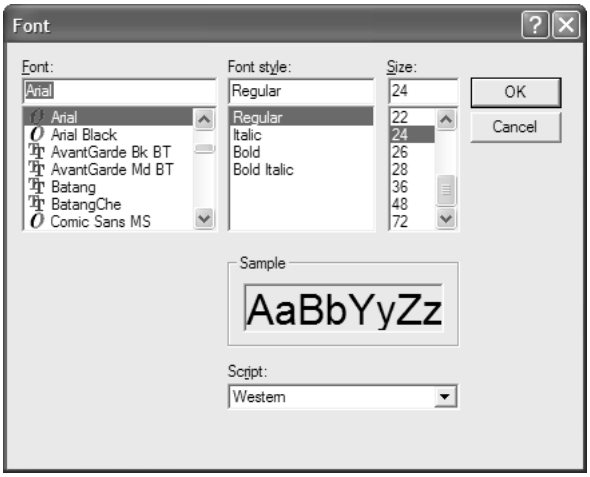
2 Click the location where you want to insert text.
The [Text] dialog box appears.

3 Enter the text in [Text].
In this example, enter "Congratulations" as the text.

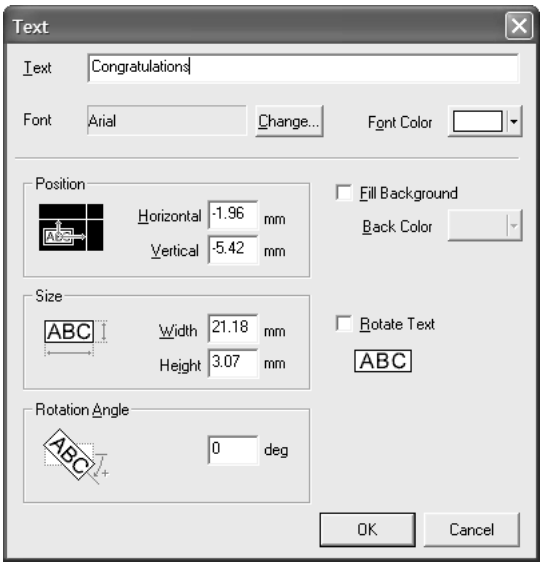
4 Click [Change...].
The [Font] dialog box appears.



5 Choose the font, style, and size, then click [OK].



6 Click [OK].



7 Drag the center of the text to position it at the desired location.

■ Save the File

When you're finished creating the marking data, save it in a file.

1 From the [File] menu, click [Save].
The [Save As] dialog box appears.

2 Choose where to save the file, then type a filename.

3 Click [Save].

Checking the Marking Results Before Marking (Preview)

You can see an on-screen preview of the image after marking before you actually start marking.
You can brightness and contrast of the image while viewing the expected results on the screen.

1 From the [File] menu, click [Print Preview...].
The [Preview] window appears.

Click to close the [Preview] window.

This returns the brightness, contrast, and gamma correction settings to their default values (brightness: 0, contrast: 0, and gamma: 0.5).

Click to send the marking data to the machine. For more information about how to send marking data, see the next section "Starting Marking," step 3 and after.

Change the display scale.

Change the brightness, contrast and gamma.

Drag to change the display position.

Starting Marking

NOTICE After you switch on the machine, initialization is performed. Do not attempt to open the cover or move the base until initialization ends. Wait until initialization finishes before attempting to mount the base.

Operate Dr.METAZA2 to send marking data to the machine.

* When changing the settings for the various items under Windows XP/2000, log on an account with "Administrators" right.

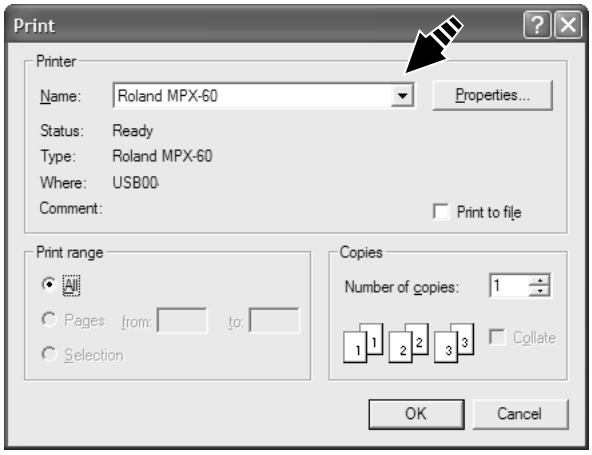
1 If the power to the machine is off, press the [STANDBY] key to switch it on.
Power-on initialization is performed, then operation stops.

The power-on initialization performs origin detection, and so a noise may be heard.

2 From the [File] menu, click [Print].
The [Print] dialog box appears.

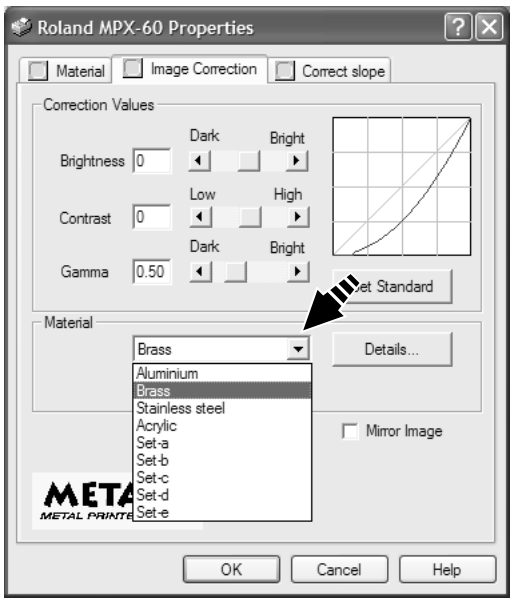
3 Click the drop-down arrow for "Name," then click [Roland MPX-60].
If this is already selected, then go on to the next step.

4 Click [Properties].
The [Roland MPX-60 Properties] dialog box appears.



5 Click [Image Correction] tab.

6 Click the drop-down arrow in the figure, then click the composition of the workpiece.
In this example, choose [Brass].



7 Click [OK].
The [Print] dialog box appears again.

8 Click [OK].
The marking data is sent to the machine, and marking starts.

■ Stop Marking

To stop marking partway through, carry out the steps below.

1 Press the [STANDBY] key.

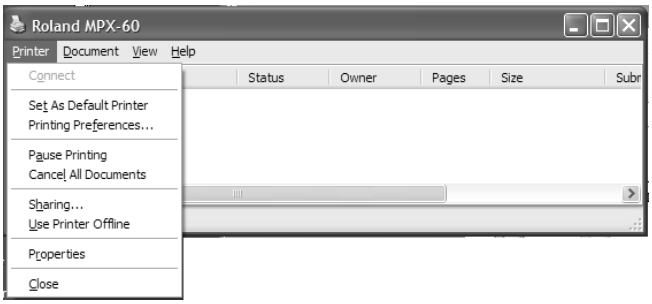
2 **Windows XP**
Click [Start]-[Control Panel] and then click [Printers and Other Hardwares]- [Printers and Faxes].

Windows 98/Me/2000
Click [Start].
Point to [Settings] and click [Printers].

3 Double-click the [Roland MPX-60] icon.

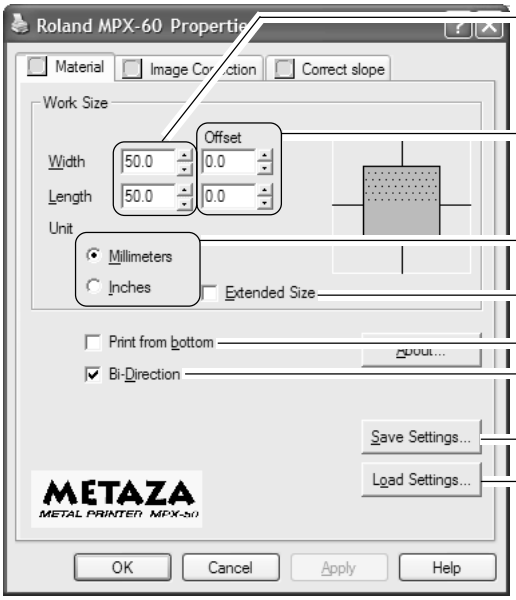
4 Stop sending data.
Windows XP/2000
From the [Printer] menu, click [Cancel All Documents].

Windows 98/Me
From the [Printer] menu, click [Purge Print Jobs] or [Purge Print Documents] to stop sending data.



■ Driver Settings

Refer to this description for making settings for items other than the ones described earlier.



Enter the size of the marking area.

This corrects misalignment of the center point. For more information, see "5 Troubleshooting", "The marked location isn't where desired."

This chooses the units of measurement for the width and length.

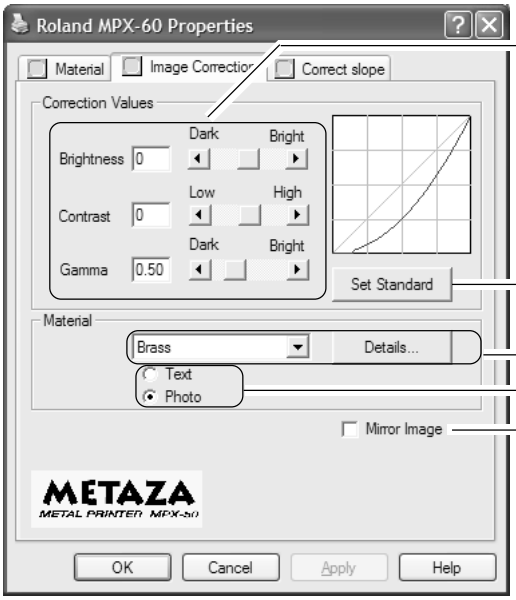
This expands the marking area (this can be set up to a maximum of 80 x 80 mm (3-1/8 x 3-1/8 in.).
However, note that when marking is performed in an expanded area (that is, outside an area of 50 x 50 mm (1-15/16 x 1-15/16 in.)), then depending on the material and the image, unevenness in darkness may occur.

To view the image during marking while marking is in progress, make sure this is selected.

If quality is a priority, switch this off. Note that the time required for marking is increased.

This saves the driver settings in a file.

This loads driver settings saved in a file.



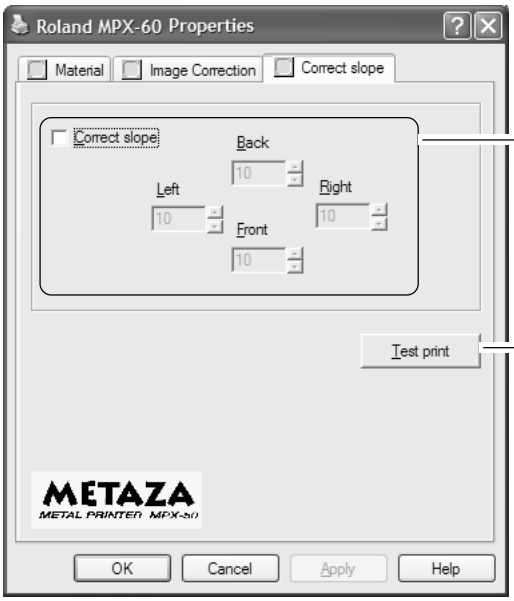
This performs adjustment when the marking results are not what you intended. See "5 Troubleshooting", "Images are unattractive."

This returns the corrected image values to the initial values before correction (brightness = 0, contrast = 0, and gamma = 0.5).

This chooses the composition of the material to mark.
The optimal marking force for the material to mark is set. To make fine adjustments in the marking force, click [Details...].

Choose Text when printing text or images with clearly defined outlines.
Choose Photo when printing photographs or other images that contain gradations.

This marks a mirror image of the marking image.



This adjusts the tilt of the base.
Enter the values taken from the results of marking the test pattern.

This marks the test pattern for adjusting tilt using the machine.

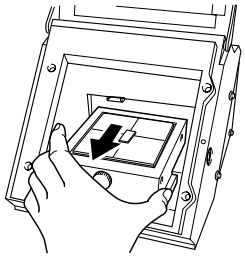
For information about how to adjust the tilt of the base, see "5 Troubleshooting", "The image at the same location is always too light (or too dark), or the image is uneven."

2-4 Finishing

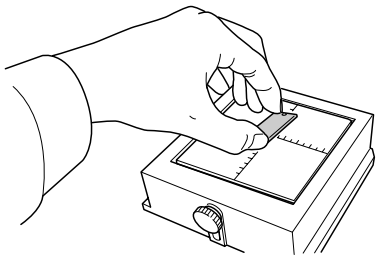
NOTICE Do not attempt to open the cover or move the base until marking has ended completely and the base has returned to its original location.
Doing so may lead to faulty operation or breakdown.

When marking ends, remove the workpiece and switch off the power.

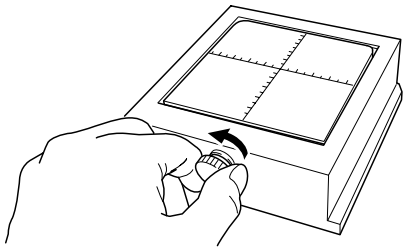
1 Grasp the base on both sides and pull back toward you to remove.



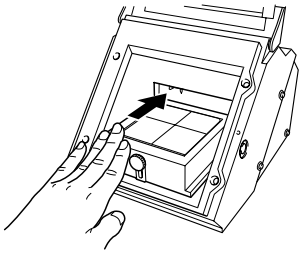
2 Remove the workpiece from the base.
If the workpiece is difficult to detach, inserting a thin, flat object (such as a piece of sheet metal or a piece of stiff paper) between the adhesive sheet and the material may make the workpiece easier to remove.



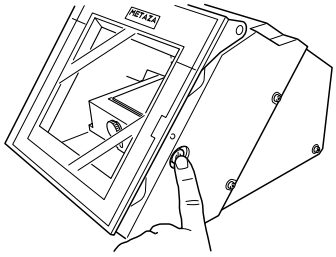
3 Loosen the screw.



4 Load the base on the machine.
Slowly press it in inward until it makes contact.



5 Press the [STANDBY] key to switch off the power.



3 Dr.METAZA2 Guide

3-1 Adding a Workpiece Shape

If you want to use a workpiece having a shape other than a circle (ellipse), quadrilateral, or diamond, you need to add the shape.
You can use either of two methods to register a shape with Dr.METAZA2.

- Acquiring the shape of a workpiece with a scanner
- Creating the shape using a commercial paint-type program

If you have a scanner, we recommend using the first method. The second method can be used if the shape of the workpiece cannot easily be acquired with the scanner, or if you don't have a scanner.

■ Acquiring the Shape of a Workpiece with a Scanner

Use a TWAIN32-compliant scanner to scan the shape (outline) of the workpiece.
If you are using a flat-bed scanner, you can scan the workpiece as it is. If you are using another type of scanner, then copy the shape of the workpiece to a piece of paper and scan the paper to acquire the shape.

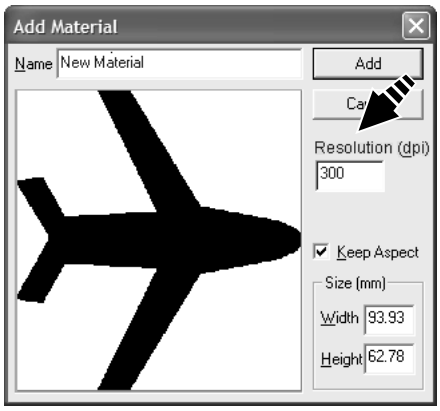
1 Place the workpiece on the scanner. Alternatively, place a sheet of paper onto which the workpiece has been copied on the scanner.

2 From the [File] menu, click [Add Material] - [Scan...].
The screen for the scanner driver appears.

3 Operate the scanner driver to scan the shape of the workpiece.
For the number of colors, select "Black and White" (binary). For information about how to operate the scanner driver, refer to the user's documentation for the scanner.

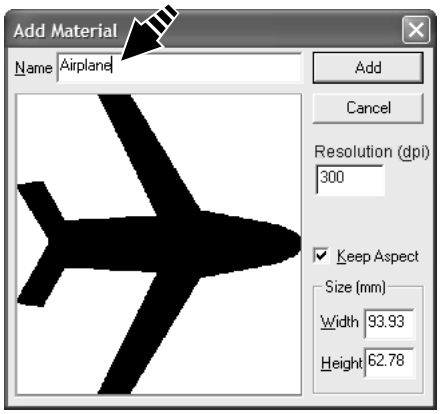
4 When scanning ends, the [Add Material] dialog box appears.

5 In the [Add Material] dialog box, for [Resolution], enter the same value as the resolution you specified with the scanner driver when performing scanning.



6 Type a name of shape.

7 Use preview to check the shape of the workpiece, and if it's acceptable, click [Add].



■ Creating the Shape Using a Commercial Paint-type Program

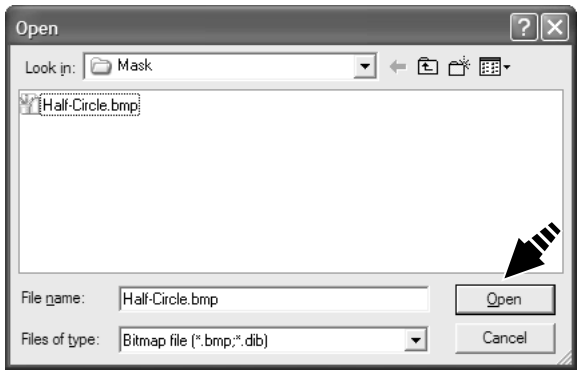
You can use a commercial paint-type program to create a shape, then register it with Dr.METAZA2.
Vector data cannot be used. Prepare bitmap data that meets the offer conditions.

Number of colors:	Binary (black and white) (Fill the interior of the shape with black, and make other portions white or uncolored.)
File format:	BMP or JPEG format

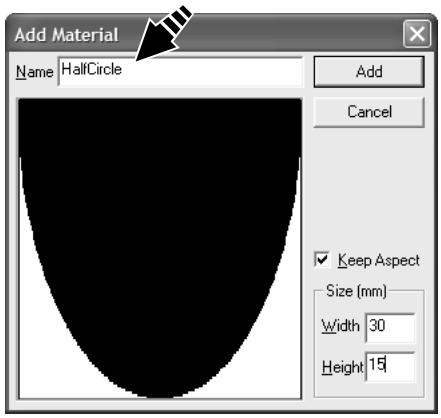
1 From the [File] menu, click [Add Material] - [File...].
The [Open] dialog box appears.

2 Click the drop-down arrow for "Files of type," then select the file format of the image.

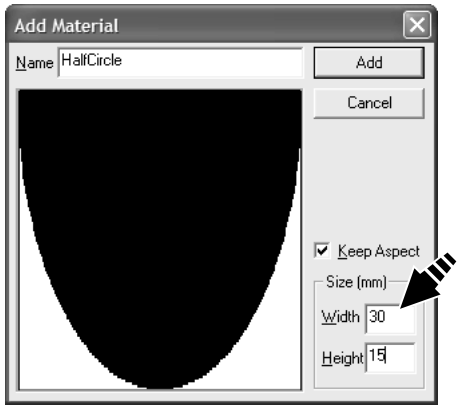
3 Select the desired file, then click [Open].
The [Add Material] dialog box appears.



4 Type a name of shape.



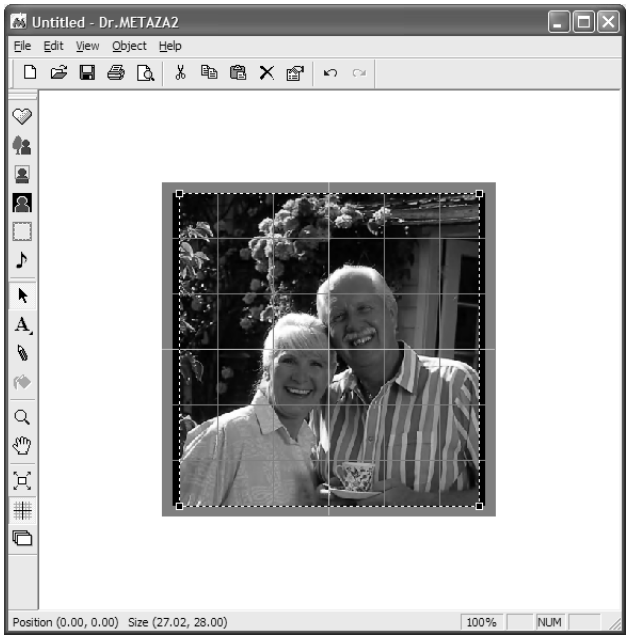
5 Enter the size of the workpiece, then click [Add].



3-2 Trimming an Image

This specifies the range of the image to import into Dr.METAZA2.
You can trim an original image to leave just the required portion.

1 Click and click the image.



2 From the [Object] menu, click [Trimming].
The [Trimming Picture] dialog box appears.

Trim an area of the same size as the workpiece.
To change the trimming location, drag the inside of the shaded frame.

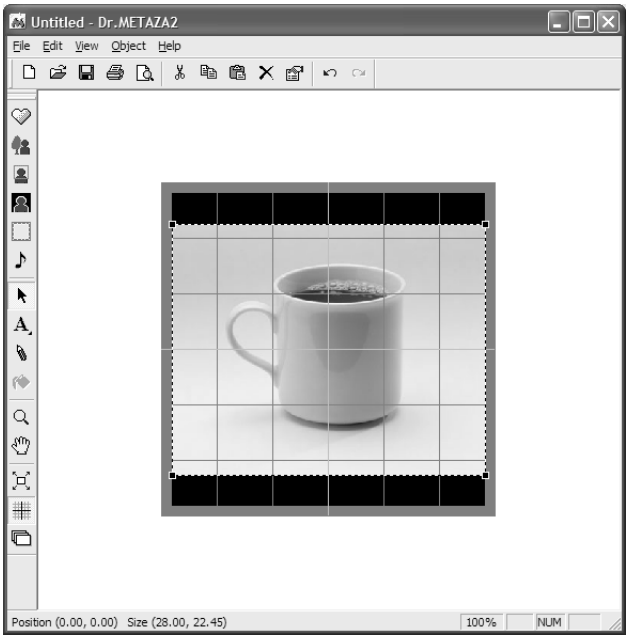
Trim the area you want.
To change the trimming location, drag the inside of the shaded frame. To change the trimming size, drag the pointers (■).

If you're not satisfied with the trimming area, you can do it over as many times as you like.
However, you can only redo the operation after importing the image until you quit Dr.METAZA2. To change the trimming area after that, reimport the original image.

3-3 Cropping Only Needed Images

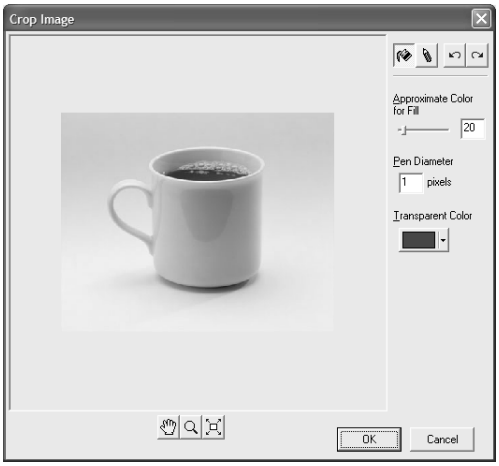
You can crop just the necessary portion of an image imported into Dr.METAZA2. This means you can extract the image of a specific person from a photograph, or conversely extract just the background image.

1 Click and click the image.

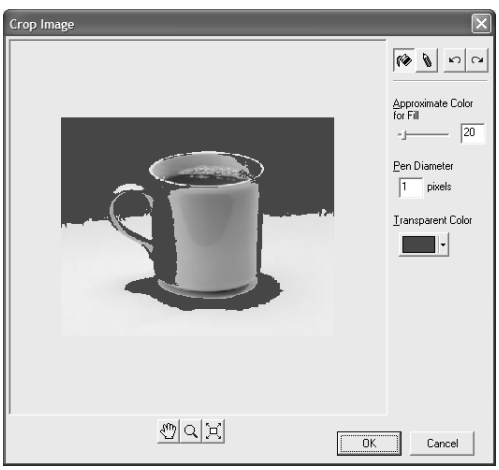


2 From the [Object] menu, click [Crop Image].
The [Crop Image] dialog box appears.

3 To change the color used to indicate areas specified as transparent locations, click [Transparent Color].
To make it easier to identify the cropped area, it may be a good idea to specify a color that lets you distinguish the contours of the area from their surroundings.
For example, when cropping the image of a person, specify a color system that differs from the person's hair, skin, and clothing.

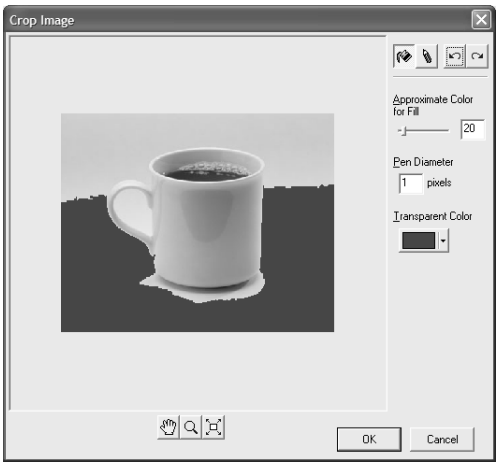


4 Click , then click the location to make transparent.
This fills the clicked pixel and adjacent pixels of approximately the same color.



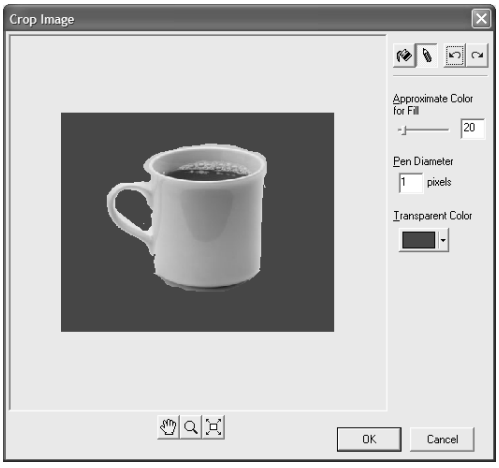
5 If the area filled is too extensive or insufficient, you can redo the operation.

Click , change the value for [Approximate Color for Fill], then click a second time.
To enlarge the area filled, make the value larger. To reduce the area, make the value smaller.
Specify the approximate transparent location by repeating this process of clicking as you vary the fill area.



6 After you have specified the approximate transparent area, finish using the pen tool.

Click , then click the area you want to make transparent.



7 To change the width of the pen, change the value for [Pen Diameter].

Tip

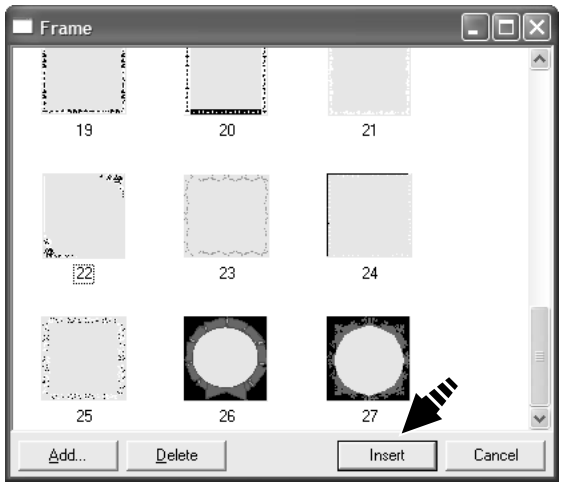
Another method is to use the pen tool to trace the outline of the image you want to crop, then use the fill tool to perform finishing in a single step.
When the outline is composed of straight lines, this method may enable you to accomplish the task more easily.
When you know ahead of time that cropping will be performed, using colors of the same type for the background enables you to perform cropping quickly and easily.
One example of this would be taking a photo of a person with a single-color wall as the background.

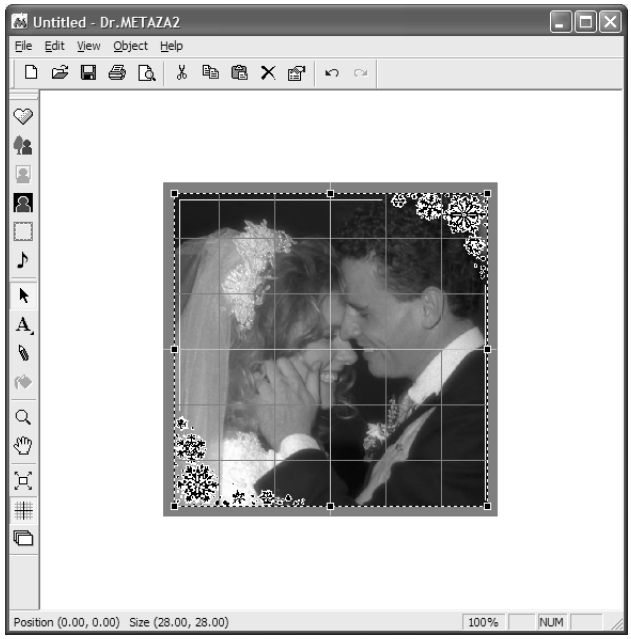
3-4 Creating a Decorative Frame Around an Image

You can use the Frame feature to achieve an effect like placing a photo or painting in a frame.
Choose the one you want from among the registered frame shapes and colors.

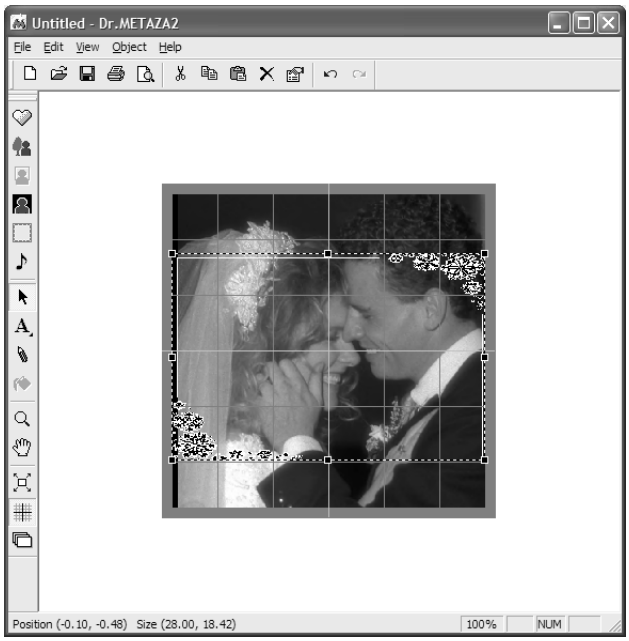
1 From the [Object] menu, click [Frame].
The [Frame] dialog box appears.

2 Click on a frame pattern to choose it, then click [Insert].
The frame is inserted in the editing screen.

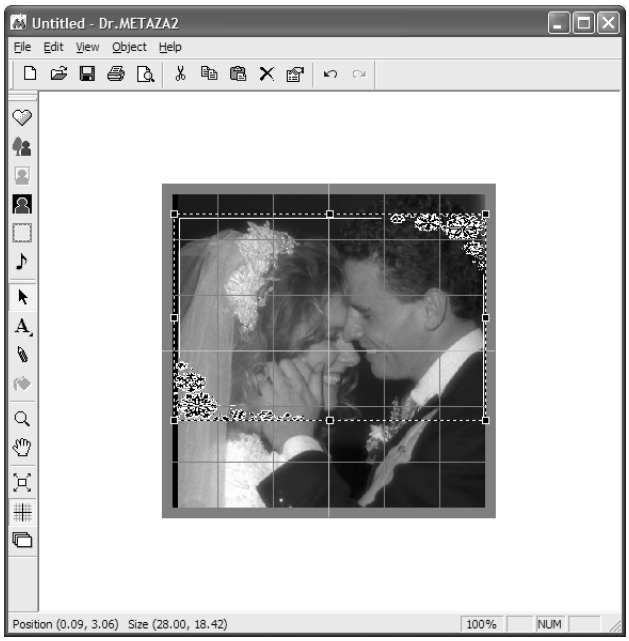




3 To change the frame size, drag the pointers (■).



4 To change the frame location, drag the frame.

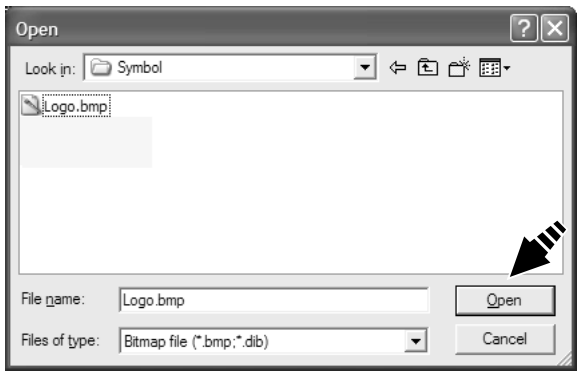


3-5 Registering a Frequently Used Image (Symbol)

You can register often-used images, such as company or organization logos, as symbols.
Registering a image that allows wide use can reduce image-importing operations, boosting task efficiency.

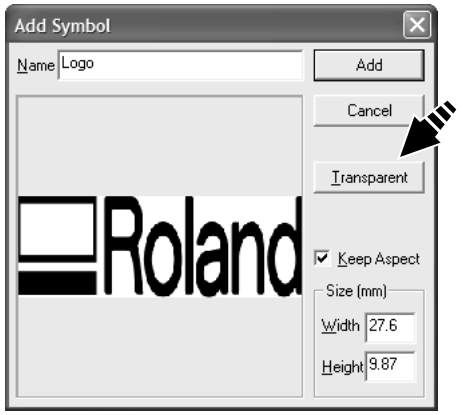
1 From the [Object] menu, click [Add Parts] - [Symbol].
The [Open] dialog box appears.

2 Select the desired file, then click [Open].
The [Add Symbol] dialog box appears.

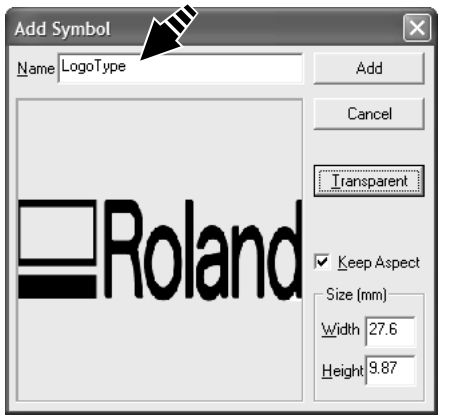


3 To show the image underneath when a symbol is inserted, specify a transparent color.
Click [Transparent].
The [Crop Image] dialog box appears.

Tip
To make a portion of an image transparent, refer to "3-3 Cropping Only needed Images."



4 Type a symbol name, then click [Add].



3-6 Importing an Image from a Scanner

If you have a TWAIN32-compliant scanner, you can call up the scanner driver from Dr.METAZA2.
For information on connecting a scanner and installing the scanner driver, refer to the user's documentation for the scanner.

1 From the [File] menu, click [Acquire...].
The screen for the scanner driver appears.

2 Operate the scanner driver to scan the image.
For information about how to operate the scanner driver, refer to the user's documentation for the scanner.

3 When scanning ends, the scanned image appears on the Dr.METAZA2 screen.

3-7 Adding a Hand-drawn Image or Text

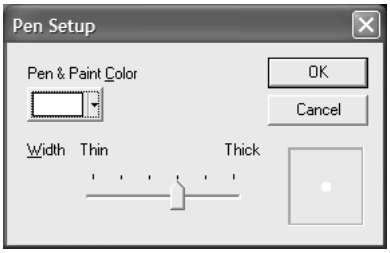
You can use the mouse to write text or draw a picture by hand and add it to the acquired image.
To acquire a picture or text drawn or written on paper, see "3-1 Adding a Workpiece Shape."

1 Click .

2 Drag the mouse to draw the picture or write text.

3 To change the pen width or color, from the [Object] menu, click [Pen Setup].
The [Pen Setup] dialog box appears.

4 To change the pen width, drag the [Width] slider to the left or right.
To change the pen color, click [Pen & Paint Color].



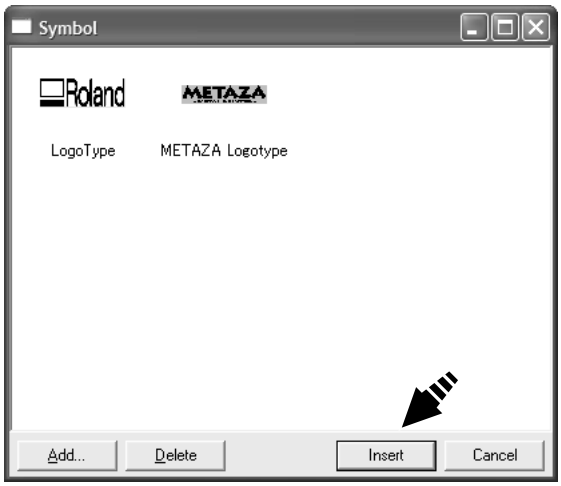
5 To delete a picture or text made with the pen tool, right-drag with the mouse.

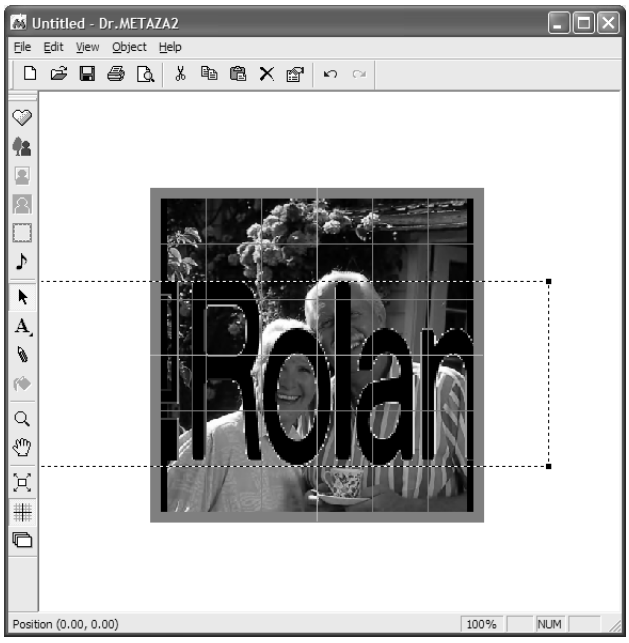
3-8 Adding a Symbol Image

This adds images registered as symbols to the editing screen.

1 From the [Object] menu, click [Symbol].
The [Symbol] dialog box appears.

2 Click on a symbol image to choose it, then click [Insert].
The symbol is inserted in the editing screen.





3 To change the image size, drag the pointers (■).

4 To change the image location, drag the image.

3-9 Registering Your Own Original Frames

You can use a commercial paint-type program to create a shape yourself, then register it with Dr.METAZA2.
Vector data cannot be registered. Prepare bitmap data in BMP or JPEG format.

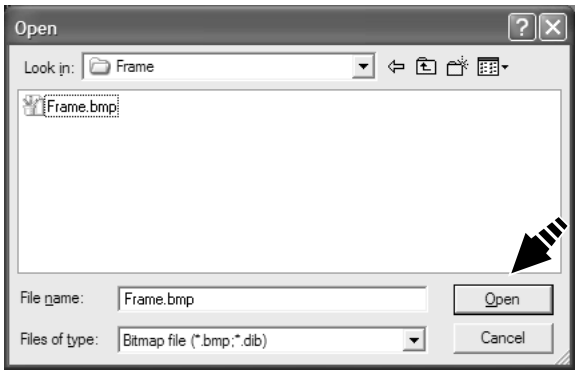
Tip

For frames, we recommend using images that meet the following conditions.

- Use images that do not contain continuous gradations or a large number of colors. (We recommend using only about 16 colors.)
- Use clearly defined borders between transparent colors and other colors.

1 From the [Object] menu, click [Add Parts] - [Frame].
The [Open] dialog box appears.

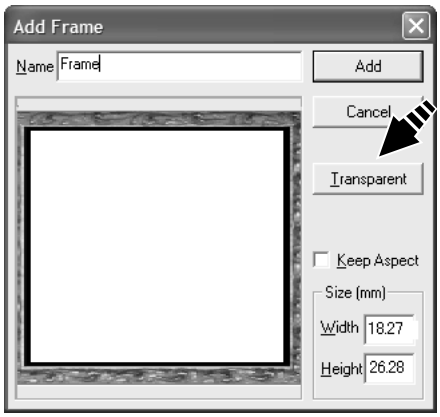
2 Select the desired file, then click [Open].
The [Add Frame] dialog box appears.



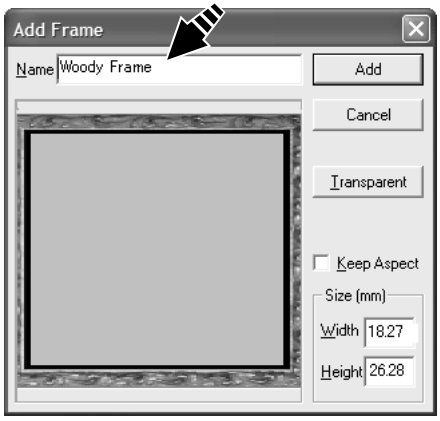
3 To show the image underneath when a frame is inserted, specify a transparent color.
Click [Transparent].
The [Crop Image] dialog box appears.

Tip

To make a portion of an image transparent, refer to "3-3 Cropping Only needed Images."



4 Type a frame name, then click [Add].



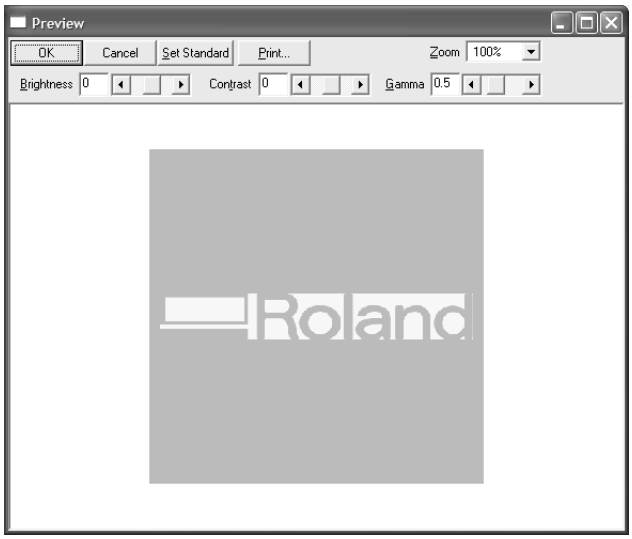
3-10 Inverting Image Gradations

This inverts the gradations of all images, including photos, frames, and the like.
You cannot invert individual objects.
Selecting [Invert] inverts the white areas of the image to black, and vice versa.

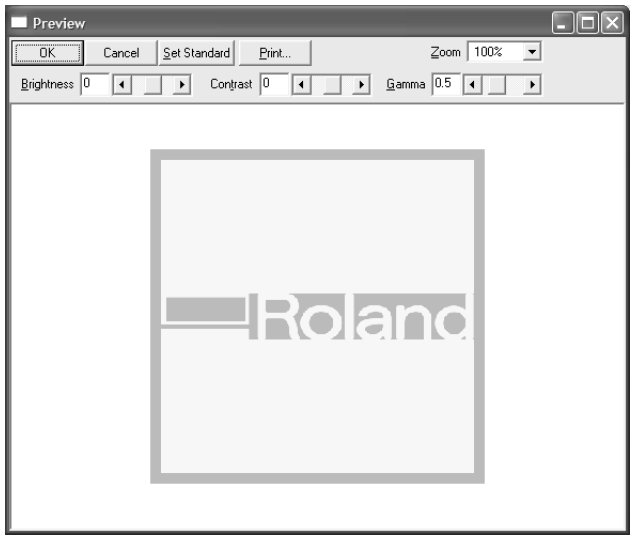
1 From the [Edit] menu, click [Invert].
The gradations of all images are inverted.

2 To check the cutting results of the machine on screen, then from the [File] menu, click [Print Preview...].

Before inversion



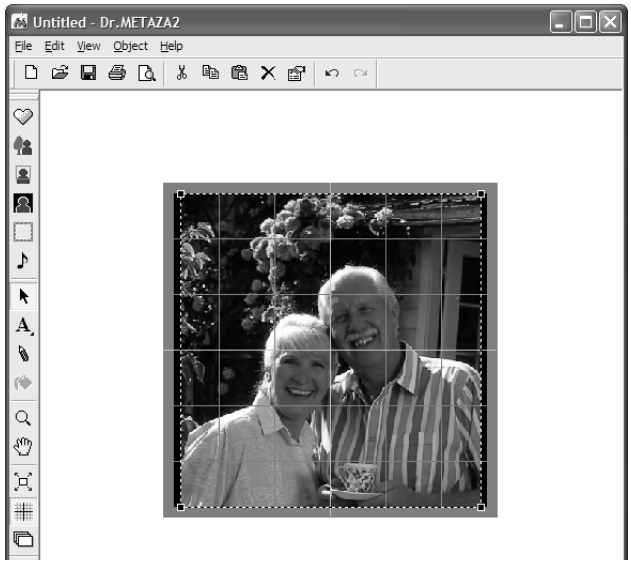
After inversion



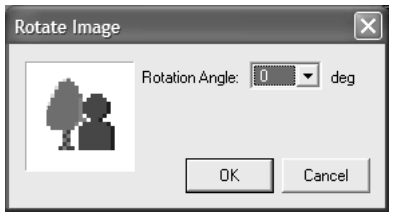
3-11 Rotating an Image

You can take an image imported into Dr.METAZA2 and rotate it in increments of 90 degrees.

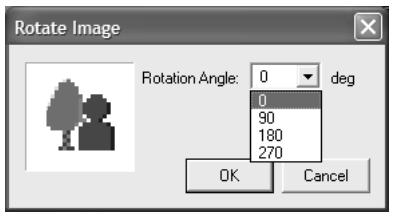
1 Click and click the image.



2 From the [Object] menu, click [Rotate Image].
The [Rotate Image] dialog box appears.



3 Click , then choose the angle of rotation for the image.
The image is rotated clockwise.



3-12 Arranging Text in a Fan Shape

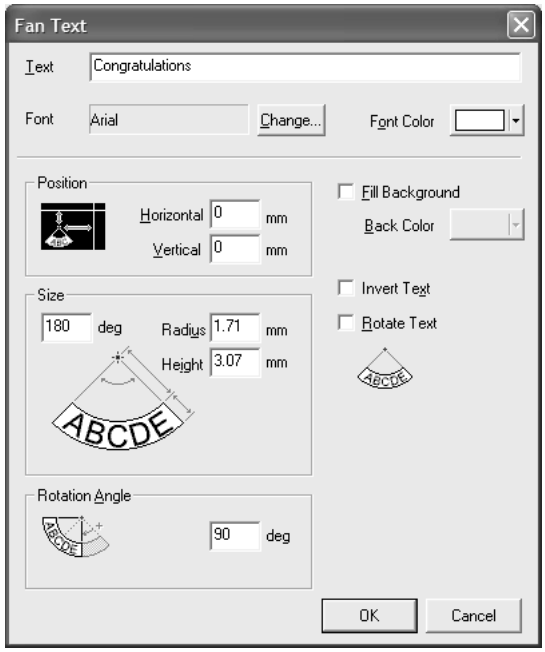
You can lay out entered text in a fan shape.

1 Click A, then choose [Fan].

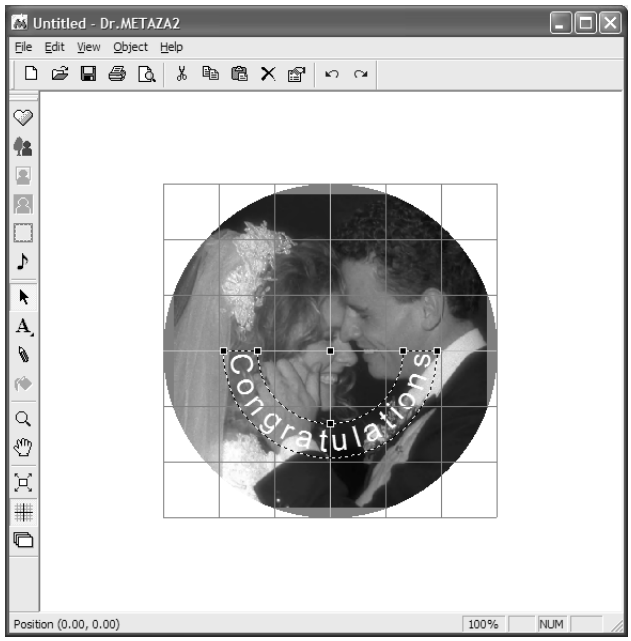
2 Click the location where you want to insert text.
The [Fan Text] dialog box appears.

3 Go to [Text] and enter the text.
In this example, enter "Congratulations" as the text.

4 Make the settings for the font, size, and rotation angle.



5 Click [OK].
The text appears in the Dr.METAZA2 window.



4 Maintenance

NOTICE

When cleaning, turn off the power.

Never lubricate the mechanisms.

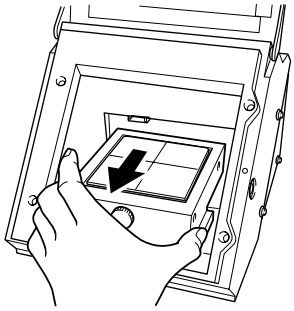
Do not clean with solvents (such as benzine or thinners).

■ Cleaning the Adhesive Sheet

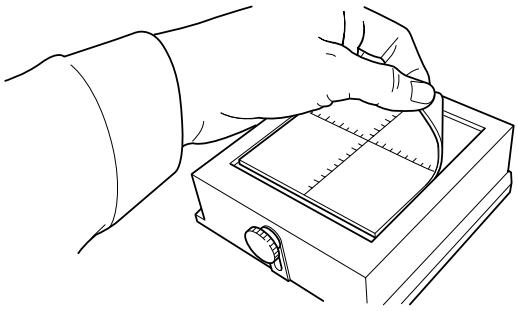
If the adhesive force of the adhesive sheet declines, or if the sheet becomes extremely dirty, then wash the sheet.

1 Press the [STANDBY] key to switch off the power.

2 Grasp the base on both sides and pull back toward you to remove.



3 Grasp the edges of the adhesive sheet and slowly peel it off the base.



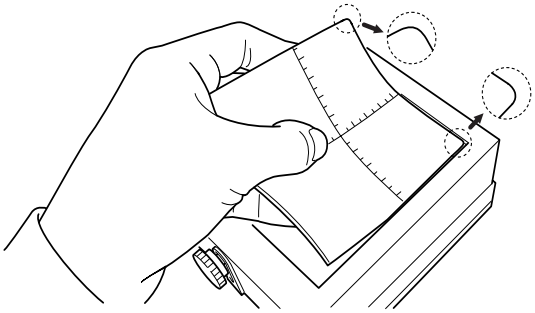
4 While submersing the adhesive sheet in water, gently stroke the surface of the sheet with your fingers. Never use a scrubbing pad or sponge.
When washing the adhesive sheet, do not stretch or bend the sheet.

If soiling is severe, use a diluted neutral detergent.

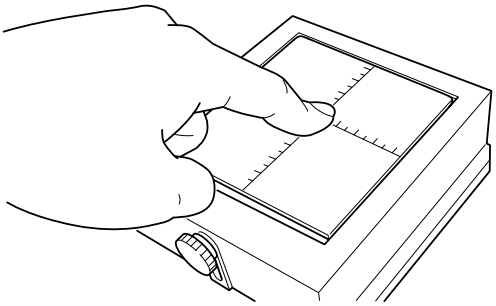
5 When you use a neutral detergent, rinse thoroughly with water so that no detergent remains on the surface of the sheet.

6 Allow the adhesive sheet to dry. Place out of direct sunlight until completely dry.
Never mount on the base while still wet.

7 With the scale facing up, align the rounded corner on the adhesive sheet with the upper-right corner of the base and set it in place. Place the sheet so that both rounded corners are at the top of the base.
Be careful not to allow any air bubbles to be trapped between the base and the adhesive sheet.



8 Press down gently on the adhesive sheet at the center and the four corners.



■ Cleaning the Body and Cover

Use a cloth moistened with water then wrung well, and wipe gently to clean.
The surface of the cover is easily scratched, so use a soft cloth.

5 Troubleshooting

■ The machine doesn't run when marking data is sent.

What to check	Remedy
Is the power for the machine switched on?	Press the [STANDBY] key to switch on the power.
Is the cable connected?	Check whether the USB cable is loose or detached. If the cable is loose or detached, switch off the power and reconnect the cable.
Is the STANDBY LED flashing?	The STANDBY LED flashes when some error occurs in the machine. Stop sending data and switch off the power to the machine. Eliminate the cause of the error, then send the marking data again.

■ The Dr.METAZA2 does not function.

What to check	Remedy
Does the computer provide the correct system requirements for Dr.METAZA2?	Use a computer that matches the system requirements for Dr.METAZA2. For more information about the system requirements for Dr.METAZA2, see "1-3 Installing and Setting Up to the Software."

■ Machining is performed, but marking is not possible.

What to check	Remedy
Is the workpiece loaded at the correct location?	If empty marking is being performed at a location other than where the workpiece is loaded, reload the workpiece.
Does the workpiece to mark meet the "Conditions for materials that can be marked"?	See "2-1 Getting Ready to Perform Marking" and prepare a workpiece that can be marked.

■ Images are unattractive -- faint (images are dim).

What to check	Remedy
Are the workpiece settings for the Metaza driver correct?	Choose the composition of the loaded workpiece. Even if the material is the same, the hardness of the marking surface may vary greatly depending on the casting method, the composition of impurities, the presence of plating, and so on. In such cases, perform fine adjustment of the marking force.
The image is uniformly dim.	Perform marking while increasing the brightness of [Gamma] or [Brightness] for the machine driver a little at a time. At this time, leave the workpiece loaded and perform overstriking at the same location. Change the driver settings and continue marking until you obtain the darkness you want.
White is reproduced, but grayscale tones are faint.	Choose a custom workpiece (settings A through E), and adjust the marking force. Perform marking while leaving the value for [Impact--MAX] unchanged and increasing the value for [Impact--MIN] a little at a time. At this time, leave the workpiece loaded and perform overstriking at the same location. Change the driver settings and continue marking until you obtain the darkness you want.

Important!

The various setting values determined with overstriking are effective only when performing overstriking. The same results are not necessarily obtained when marking is performed with a new workpiece under identical conditions.

■ Images are unattractive -- dark (all images are whitish).

What to check	Remedy
Are the workpiece settings for the Metaza driver correct?	Choose the composition of the loaded workpiece. Even if the material is the same, the hardness of the marking surface may vary greatly depending on the casting method, the composition of impurities, the presence of plating, and so on. In such cases, perform fine adjustment of the marking force.

■ Images are unattractive -- uneven.

What to check	Remedy
Is the marking surface slightly uneven?	Replace with a workpiece having a level marking surface.
The marking surface is not uneven, but image darkness is uneven.	Overstriking with a workpiece loaded at the same location may improve image quality. Change [Gamma], [Brightness], and [Contrast], then perform overstriking with the workpiece.
Is [Bi-Direction] selected?	Selecting [Bi-Direction] makes the time required for marking shorter but it may cause poor image quality. In this case, change a workpiece and clear the selection for [Bi-Direction].
Is a portion of the image missing?	The workpiece may not be loaded correctly, or there may be partial differences in the height of the marking surface. Load the workpiece again.

■ The image at the same location is always too light (or too dark), or the image is uneven.

If the image is often too light near the front-right area of the base, adjusting the tilt of the base may improve image quality. Doing this can reduce unevenness in the image due to the marking position.
Image unevenness due to tilt is often hard to detect near the center of the base, and tends to become more conspicuous at distances increasingly farther away from the center (especially with larger images). Adjustment for generally favorable image quality is performed when the machine is shipped from the factory, but you should adjust the tilt to for each individual situation to achieve an optimal state. Note that even after adjustment, image unevenness may occur that is due to factors other than tilting of the base, such as warping or deformation of the workpiece. Also, adjustment has no effect on image unevenness that is unrelated to the marking location, such as cases in which the location where image unevenness occurs is different with each workpiece or image.

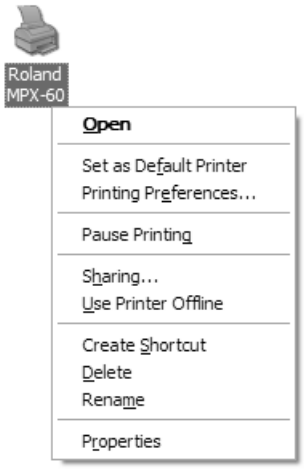
1 Load the workpiece included with the machine at the center of the base. If the included workpiece has been used up, then prepare a workpiece that is larger than 60 mm and has a smoothness of 0.05 mm or less.

For information on how to load the workpiece, refer to "2-2 Loading the Workpiece."

2 Go into the [Printers] folder. Right-click the [Roland MPX-60] and open the setting screen for the METAZA driver.

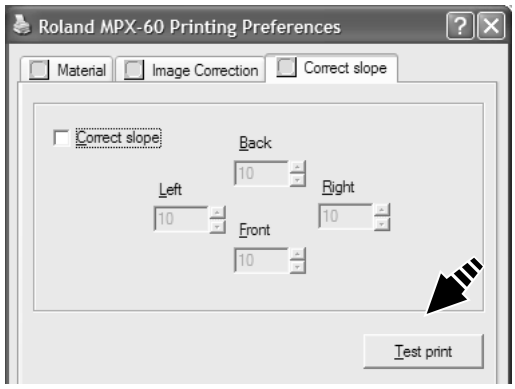
Windows XP/2000
Click [Printing Preferences].

Windows 98/Me
Click [Properties].

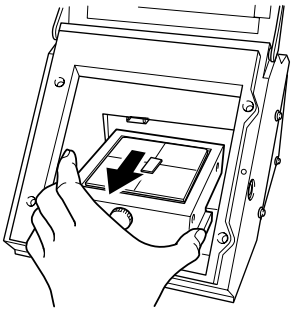


3 Click the [Correct Slope] tab.

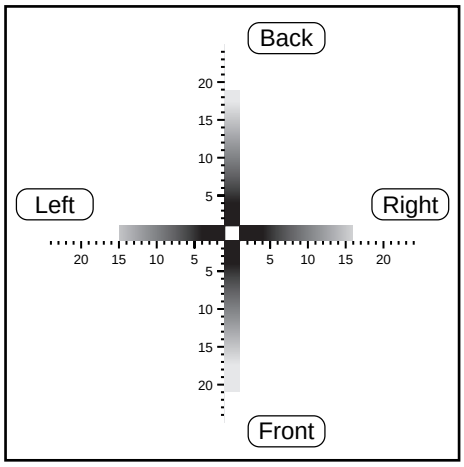
4 Click [Test print].
The test pattern is marked on the workpiece.



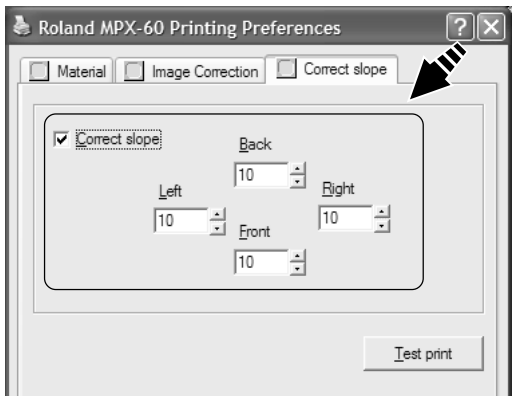
5 Grasp the base on both sides and pull back toward you to remove.



6 Use the scale to read and note down locations where the test pattern is not continuous or not visible. Note down the values in all four directions (front, back, left, and right).



7 Select [Correct slope] and enter the scale values you noted into the driver.



■ The marked location isn't where desired.

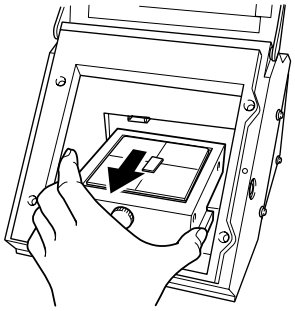
The center of the base scale may not coincide with the machine's marking origin point.
To correct displacement between the scale center and the marking origin point, follow the steps below.

1 Load an unneeded workpiece that will not be used for marking on the base. Prepare a workpiece that is about 10 to 20 mm (1/2 to 1 in.) square.
For information on how to load the workpiece, refer to "2-2 Loading the Workpiece."

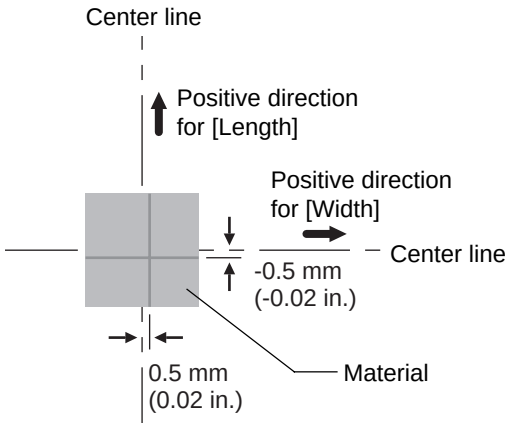
2 Start Dr.METAZA2, and in the [Sample] folder, open [Axis.dmz].

3 Perform marking.

4 Grasp the base on both sides and pull back toward you to remove.
When doing this, be careful to ensure that the loaded position of the workpiece does not change.



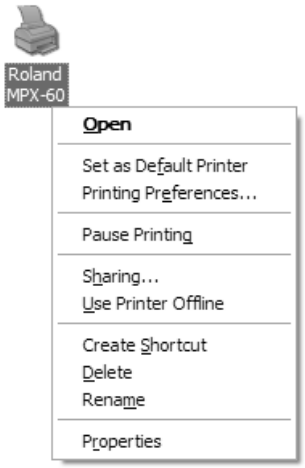
5 Measure and make a note of the displacement between the base-scale centerlines and the crossed lines on the workpiece.
The figure at right shows a positive displacement of 0.5 mm (0.02 in.) for [Width] and a negative displacement of 0.5 mm (0.02 in.) for [Length].



6 Go into the [Printers] folder. Right-click the [Roland MPX-60] and open the setting screen for the METAZA driver.

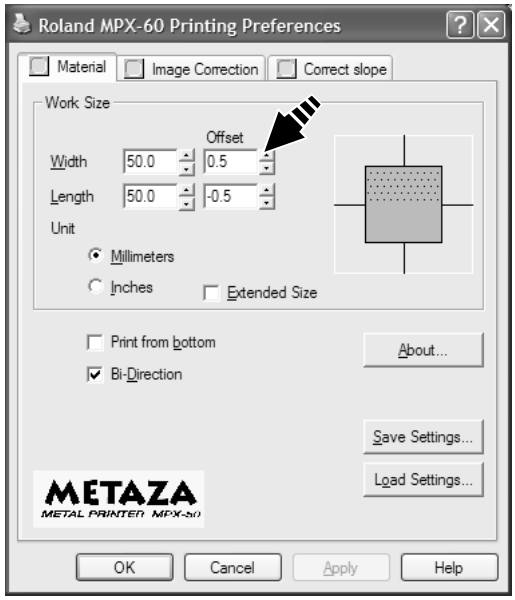
Windows XP/2000
Click [Printing Preferences].

Windows 98/Me
Click [Properties].



7 Click the [Material] tab.

8 Enter the dimensions of the displacement you noted in step 5 as the [Offset] width and length.



Important!

When you open the properties for a driver from a program such as Dr.METAZA2, any values you set are temporary, and are not saved.
To save the settings for driver properties, go into the [Printers] folder and open the properties for the desired driver.

Specifications

Main Unit Specifications

Printing method	Impact (single-dot configuration)
Resolution	265 dpi/212 dpi (Photo/Text)
Printing area	80 mm x 80 mm (3-1/8 in. x 3-1/8 in.)
Printable material	Gold, silver, copper, platinum, brass, aluminium, iron, stainless steel, etc. (Vickers hardness [HV] of the marking surface must be 200 or less.)
Loadable material size	Maximum 90 mm x 90 mm x 20 mm (thickness) (3-1/2 in. x 3-1/2 in. x 3/4 in.)
Printing direction	Unidirectional printing or bidirectional printing (Selectable with Windows driver)
Printing speed	15 mm/sec (9/16 in./sec)
Interface	USB interface (compliant with Universal Serial Bus Specification Revision 1.1)
Power supply	Dedicated AC adapter
	Input : AC 100 to 240V ± 10% 50/60Hz 1.0A
	Output : DC 19V 2.1A
Power consumption	Approx. 10W
Acoustic noise level	Under 70 dB (A) (According to ISO 7779)
Operation temperature	10 to 30˚C (50 to 86˚F)
Operation humidity	35 to 80% (no condensation)
External dimensions	235 mm (W) x 322 mm (D) x 215 mm (H) (9-5/16 in. (W) x 12-11/16 in. (D) x 8-1/2 in. (H))
Weight	7.0 kg (15 lb.)
Packed dimensions	310 mm (W) x 385 mm (D) x 320 mm (H) (12-1/4 in. (W) x 15-1/4 in. (D) x 12-3/4 in. (H))
Packed weight	9.0 kg (20 lb.)
Accessories	AC adapter, power cord, CD-ROM, leveler, marking material for testing, phillips screwdriver and user's manual

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